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Motor Age

Vol. II. No. 7 AUGUST 14, 1902 5 Cents

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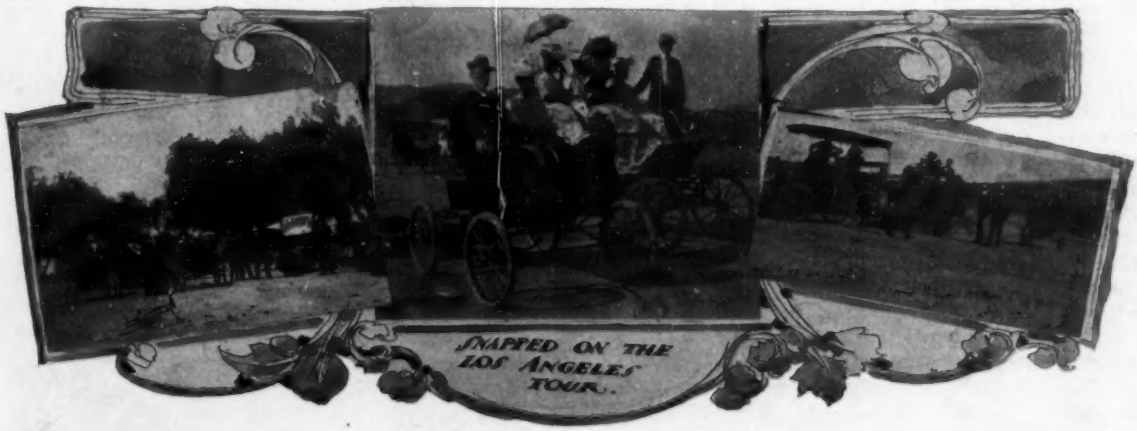
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Munger Automobile Tire Company *TRENTON, NEW JERSEY*

Motor Age

WITH WHICH IS INCORPORATED CYCLE AGE

VOL. II. NO. 7. CHICAGO, AUGUST 14, 1902. $2.00 PER YEAR



Los Angeles, Cal., Aug. 3.—Los Angeles is a city of about 120,000 population, but immensely practical when it comes to the use of automobiles. Over sixty Oldsmobiles have been sold here since February and in two public storage stables alone can be counted sixty odd electric carriages, while in steam carriages probably fifty are owned here. There are also about a score of various makes of gasolines and several new ones on the way. Strange to say, with so many automobiles in use in this city, there is no automobile club. There was one organized nearly 2 years ago, but it had no reason to live and was allowed to die. At that time there were only electrics and Locomobiles in use and even the steam carriage owners did not care to try California country roads, so there were no country runs.

Until a number of touring cars are owned here there will be no demand for an automobile club, as present owners of automobiles are practical and use their horseless carriages to take the place of horses and save time, not as a luxury. Any hour one can go along our main streets and see Oldsmobiles, Waverleys and Locomobiles standing along the curb on almost every block. The other day I saw two horses hitched on upper Broadway with an Oldsmobile butting in between them and the horses were trying to nip and bite each other over the curved dashboard of the Oldsmobile as naturally as though standing in their own stalls. The three conveyances were owned by rival real estate speculators and both the wagons and the auto needed washing and painting.

Chas. J. Heinemann has just moved into his new stable and store at the corner of South Main and Seventh streets. The stable is of brick, 50x90 feet or larger, formerly used as an extensive electric machine shop and salesroom. As both Seventh and Main streets are asphalt surfaced the location is ideal. Mr. Heinemann has placed five electric delivery wagons already and has several others sold. Quite a number of stanhopes are also in use here and of late some runabouts have been delivered.

The Waverley has the lead locally among electric carriages, W. K. Cowan having sold over a score of runabouts for Los Angeles use besides making sales in Riverside, Pasadena and other South California cities. An electric livery stable was fitted up here a year ago with Waverleys, the autos being tally-hos, breaks and runabouts, all with the famous Sperry batteries. Cowan, who was content to get one or two Waverleys at a time, now has carloads shipped here monthly.

Crippen & Church, who opened up in the automobile

business early this year with the Oldsmoile, have done a most excellent business. Up to date over sixty machines have been sold. Most of these are in use in this city, but here and there in nearby towns Oldsmobiles were also placed. Several went to Riverside county, some 60 miles inland. One went to Santa Paula, 70 miles away, and these outsiders come and go from this city on business with the handy little runabouts instead of using the railroads. Crippen & Church also have the agency for the Columbia electric and have a Columbia Victoria Mark XXXI on hand as a sample.

The local White agents, Ryus & Thies, have sold about a score of White steam carriages, all of which are giving grand satisfaction. Three went to Pasadena, our sister city, 10 miles to the north. Another went to Santa Monica and some even to Santa Barbara, 115 miles north. Many others are ordered but cannot be gotten for some time.

The Winton had a good start here last year, but only one has been sold this year, because the coast agents, the Western Iron Works, were too busy with other business to boom Wintons, and besides people here want to see and test carriages before buying, and a touring car was too big an experiment for local agents. Still the Western Iron Works placed a Winton touring car at Sacramento and has lately sold one to Davies, the big lumberman here, who already owns a Waverley runabout. This Winton is now due here.

The Tufts-Lyon Arms Co., pioneer sporting goods house of the southwest, has taken the Toledo agency and has a carload of Toledo steam carriages ordered.

The Broadway Automobile Stable now houses thirty-two carriages, all but four being electrics. This is a most excellently conducted storage establishment, in charge of Arthur Harrison, an English electrician of ability and experience. The Electric Auto Livery, at 333-331 South Main street, does a livery business as well as storage and with the carriages it owns houses about thirty automobiles, made up mostly of electrics, although gasoline and steam carriages are found there regularly. It is now owned by Dion Geraldine, a Chicago man.



Seen at the Endurance Run—Who Was Running the Machine?

R. C. Hamlin, a local bicycle and automobile dealer, is closing up his business so as to go to South Africa and join Will Jenkins, formerly of this city and who lately visited Los Angeles.

Hodge Bros. Co., of Pasadena, coast agents for the Peerless, are anxiously waiting for a carload of touring cars.

Los Angeles is having another real estate boom, this time with a healthy growth like that of Minneapolis a few years back, and real estate men hit a new plan to boom the villa track in the Cahunga Valley some 10 miles west of Los Angeles. Automobile owners were persuaded to turn out for a good road celebration in honor of the new boulevards in Cahunga Valley. This was the first country run for automobiles ever undertaken in Southern California, except when several Locomobiles went out together over a year ago to Ontario and when two Wintons made a record run a year ago.

There was a parade around Los Angeles streets and then a race over the foothills to Hollywood and the new boulevards. About a score of automobiles turned out. Of these were two tally-hos, one a three-seat gasoline made in Chicago and the Waverley tally-ho. A number of steam and electric surreys and several brakes with Oldsmobile dos-a-dos made up the double rigs. Among the singles were a number of Waverley runabouts, Oldsmobiles, Mobile and Locomobiles, a White and some electric stanhopes. Harry Turner and Willie Hook had out their Locomobile touring cars and Marcher, of the Broadway stable, came out with his Columbia phaeton. The run was a good advertisement for the autos, but the lack of system going and coming resulted in reckless driving and spreading out of the line. All the Oldsmobiles bore a triangular banner with the words, "We want good roads."

COMPANY WILL INSURE AGAINST DAMAGE.

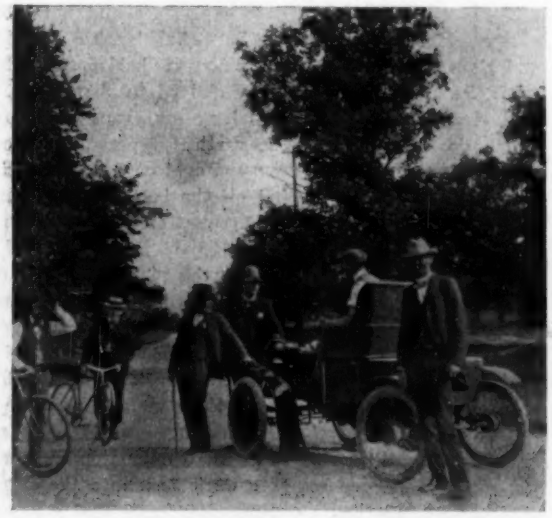
A new corporation, known as the Vehicle Repair Co. of America, has been incorporated under the laws of the state of New York with a capital stock of $100,000. The object is to pay for repairs to vehicles damaged by accident. The company agrees for a stipulated sum to repair all damages to vehicles arising through accident that are covered by agreement during the time the agreement remains in force. The company does not, however, agree to make good any damage caused by wear or by defect in material, but clients are given reduced prices on such work. When contract holders have no particular shop to which they may wish to send their vehicle, the job is placed in first-class workshops. The company does not assume any liability for damage to automobiles caused by explosion, or fire the result thereof. Boilers or machinery for propelling vehicles, steering gear or rubber tires are not covered by the terms of the agreement.

CZAR DENNIS STRIKES A SNAG.

For the last month the overzealous officials of the village of Glencoe, a pretty spot on the Sheridan Road, leading north from Chicago, have been enjoying a lot

of fun and enriching the village funds at the expense of the automobile fraternity. Whether vehicles were driven at a speed in excess of the legal limit or not seems to have cut no figure. First of all the officers hid in the bushes by the roadside and on the approach of an automobile stretched a rope across the road in front of it. Derisive laughter on the part of one or two passing automobilists seems to have been the only result of the rope trick, but, not to be outdone, the mayor—his name is Dennis—procured a wire cable. This did the business and automobilists were stopped indiscriminately.

Just about the time they were growing angry at this unwarranted behavior on the part of the village officials and were planning to give Mr. Dennis a test case and sundry other troublesome matters to attend to, it happened that Peter Van Vlissingen, a well known real estate man, happened that way in his automobile. He was arrested and was doubtless expected to promptly pay a fine of $25, as many contributors to the village



Czar Dennis and His Staff.

funds had done before him. But unfortunately for their plans he was not built that way.

Mr. Van Vlissingen insisted on a trial, made the officers look foolish by their own admissions, was acquitted and forthwith commenced a damage suit, claiming $2,000 for malicious arrest. During the trial he forced the policeman, the mayor and another witness to admit that they did not know how fast he was going; that they did not know how many feet or rods there were to a mile and they had some thought of letting him go until he became "too funny."

The accompanying picture shows Dennis standing behind an automobile, his police officer, the justice of the peace and two bicycle riders whose business it was to operate under the mayor's instructions.

Specially Designed for Postal Service.

Self-propelling mail wagons are the idea and invention of George F. De Groot, a letter carrier of Morristown, N. J., who has been in the service of the government about 6 years. He has 18 patents covering the mail wagon. His wagon is divided into two parts, the front for the driver, or motorman, and the rear for the carrier. The front compartment is entered only by a door, and once the driver is inside he cannot get out until released by the carrier. The rear compartment can be opened from the outside only, and thus the wagon and mail are in keeping of the carrier and he is entirely responsible for it. The carrier's compartment is fitted with pigeon-holes, stamp drawers, money boxes, etc., like a post office, so that he can lay out his route. The first mail wagon made for trials, etc., weighs about 800 pounds. Mr. De Groot will make a tour with his wagon through New Jersey. The wagon has been approved by the postmaster-general for use by suburban and mounted carriers, but the department does not furnish outfits to carriers. These have to be bought. Mr. De Groot is going to sell wagons to mounted carriers or postmasters, or any others in the mail service who want them. He says that the automobile, with driver, is $200 a year cheaper than a horse and wagon with driver. Ira Lynn Thompson, an electrician, whose technical knowledge made the machine a success, is in partnership with Mr. De Groot.

In the Hanoverian Fire Department.

An electric fire engine has been added to the fire department of the city of Hanover, Germany. The day after the purchase the vehicle was used in a bad fire and gave such good results that the chief of the department made a request for another engine. The vehicle can carry, beside the regular fire apparatus, a team of eight men. The apparatus is operated by an electric motor. Its speed is of about 10 miles per hour and it will run about 15½ miles without recharging. The storage batter of forty-two cells is located under the seat. The pump will deliver about 990 gallons of water per minute. The cost of the engine is said to be about $6,000.

Once Bit, Twice Shy.

A good story is told of a magistrate who had to make a hurried journey to a town 24 miles away. As there was no suitable train, he went to a motor car agency, and inquired how long it would take to convey him to his destination by automobile. "Two hours and a half," was the answer. The magistrate was surprised. "I thought you could have managed it in an hour or so," he said. "Well, no doubt I could," retorted the motorist, "but the other day you fined me 40 shillings for furious driving."—London Daily Graphic.

The following advertisement recently appeared in an English paper: "If the motor party of four who had a private sitting-room and use of piano, and one glass of cherry brandy at ——, May 23, and who left a powder puff, will call they can have the latter by paying for room, otherwise the same will be sold to defray expenses."

A French consul reports that there is a good demand for light automobiles in Japan.

Motor Age

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The editor will be glad to receive communications for publication. They must be accompanied by the names and addresses of senders, which will not be used if request be made to that effect. Contributions will not be paid for unless accompanied by notice that payment is expected.

Subscription, Two Dollars a Year, - Six Months, One Dollar

HORIZONTAL VERSUS VERTICAL CYLINDERS.

One of the arguments frequently advanced against the horizontal form of motor is that the weight and movement of the piston cause the cylinder in time to wear oval. Despite this reasoning, however, M. Heirmann, a Belgian engineer, by simple mathematics has recently shown that in an actual small gasoline motor the component normal to the cylinder surface of the reaction of the crank and the piston through the connecting rod, at a certain point of the stroke, reaches a value ten times greater than the weight of the piston. The wearing effect due to the weight of the piston is therefore negligible as compared with the wear due to the crank reaction. He states that the two effects, crank reaction and weight of the piston, bearing against the lower cylinder surface, may, in a horizontal motor, be caused to add to each other or to partly neutralize each other, according to whether the crank "turns over" or "turns under," and the tendency for the cylinder to wear oval may therefore be actually smaller in a horizontal motor than in a vertical motor.

The Paris-Vienna race, on the other hand, seemed to demonstrate, as conclusively as such an event can show anything, the superiority of vertical over horizontal cylinder motors, when used under the most trying conditions. Every car equipped with a horizontal motor fell by the wayside, and all from the same cause, stuck pistons and consequent broken shafts or stripped gearing. All the cars which met this fate had been previously used for varying periods of time, and traveled a great many miles under ordinary conditions. But when put to the critical test, a race over mountain tops, and the worst possible roads covered with fallen boulders and snow, they were found wanting. Nearly all the automobiles of European make are now equipped with vertical motors, as a result of better experience and not from choice. Hurtu, Peugeot, Rochet-Schneider, De Dietrich and Mors all held out for their favorite horizontal motor until the last, but finally were obliged to abandon it.

Horizontal cylinder motors have numerous objections which do not apply to the vertical type. After continued use the cylinders are worn oval on account of the weight of the piston resting on the bottom. They are harder to keep lubricated on account of the oil running off the upper half of the piston to the lower half. If a supply of oil, sufficient to keep the piston in working order, is fed into the cylinder, the combustion chamber is liable to fill with oil, defiling the mixture, and covering the sparking device. Horizontal motors require independent lubricating devices which must be susceptible of very close regulation. Vertical motors need only splash or crank chamber lubricating, and there is no danger of the oil working into the combustion chamber, its natural tendency being to work back into the crank chamber by gravity.



Contrary to illustrious precedents among gentlemen occupying positions of authority, and contrary, even, to the inclination which his name might be said to indicate, Mayor Finer, of Waukegan, Ill., has vetoed an unreasonable ordinance under which it was proposed to set a ridiculously low speed limit for automobiles. This, too, in spite of the fact that other towns, not very far away from Waukegan, have profited handsomely in the past, and evidently intend to do so in the future, from similar regulations imposed upon automobilists and cyclists. Fair-minded persons, even in his own town, where operators were accorded all possible courtesy during the late endurance run, will doubtless congratulate Mayor Finer upon his moral courage, and it is to be hoped that his example in moderation will be emulated in other communities.

Wiring for Motor Cycles

BY FREDERIC B. HART

Troubles with ignition are more or less common to all types of gasoline vehicles, but are most noticeable in motor cycles, owing to their simplicity and freedom from annoyance in other directions. The most prevalent causes of disturbance are arcing of the secondary current outside the motor and lack of proper contact in the make and break mechanism, the latter being often due to the burning out of the platinum contact points. The writer having had his share of trials in each case, has found relief by changing the system of wiring.

Nearly every motor cycle on the market is fitted with a three terminal coil and the wiring is, in nearly every case, identical with the wiring system shown in diagram A. In the three terminal coil the terminal marked primary is formed by joining one each of the ends of the primary and secondary windings, the other ends being marked respectively "battery" and "secondary." It will be understood that the wire from the primary terminal carries both the primary and secondary currents. In

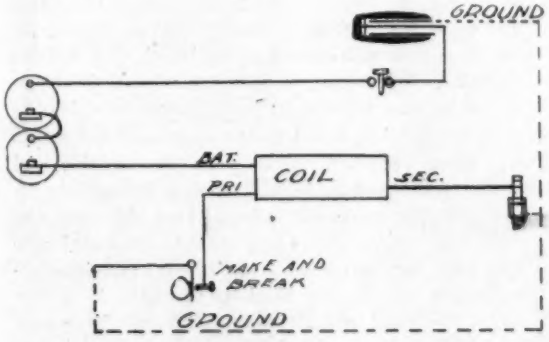


Diagram A.

diagram A the primary wire connects with the insulated post of the make and break, whence the current goes during the time the circuit is closed, through that mechanism to the motor frame, or, as it is generally termed, the "ground."

The objections to this condition are, first, the secondary current is broken at the make and break at the same instant that the spark occurs at the plug, which is in many cases largely responsible for arcs or shorts outside the motor when the spark plug is slightly fouled, while were the secondary circuit intact, except at the plug, the spark would pass at the proper point. Another and serious objections is that the passing of a high tension current through the platinum contacts in the make and break tends to destroy these points much more rapidly than would the low tension primary current.

The only apparent reason for the prevalence of this style of wiring is that it allows the use of a one terminal switch in the grip. In the form of grip switch in general use screwing up the grip forms a contact between the wire leading to the switch and the handle-bar tube and thence through the frame of the machine to the motor.

Diagram B shows a system of wiring which the writer has been using for some time and under careful surveillance, during which time there has been no trouble

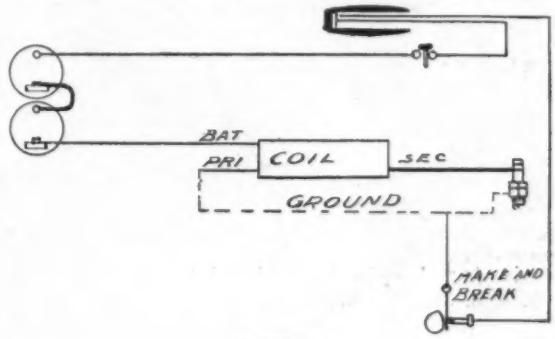


Diagram B.

with the spark and the platinum contacts show no sign of wear. The secondary circuit is at all times intact, except at the spark plug, and owing to the directness of the circuit the danger of shorts is reduced to a minimum.

Another point that, while perhaps not of paramount importance, is worthy of consideration, is that all the breaks in the primary circuit are in series in one wire and all the contact points at these breaks are made with consideration for the work cut out for them, and in no case has the circuit to pass through greasy bearings as is the case when the ground to the motor is made from the handle-bar, as in diagram A.

For the benefit of any who might desire to change the wiring of a machine equipped with the common form of handle-bar switch a simple form of altering that device to a two terminal switch is shown in diagram C. Description of the original form of this switch is unnecessary further than to state that in that condition the circuit is closed by screwing the metal disk in the grip against the end of the handle-bar, thus forming a contact between the threaded stud in the center of the fiber plug and the handle-bar tube. In the modification it is of course necessary that both wires be kept from contact with the handle-bar and that the disk in the grip should not be allowed to come in contact with the end of the tube, which condition is easily attained by the proper extension of the small inner tube a. The

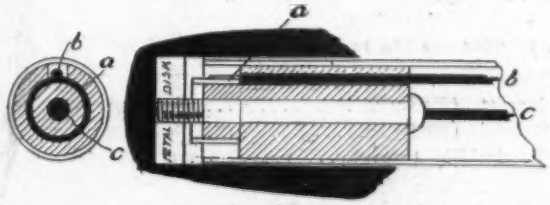


Diagram C.

wire, b, from the battery is attached to the tube, a, in any desired manner, but a simple and effective way is to solder it, allowing the wire to run partially around the outer circumference of the tube. The wire c, is the original wire from the terminal of the cut-out plug and need not be in any way disturbed.



RACING

Paris, Aug. 1.—Five hundred and twelve kilometers in 5h. 53m. 39s., 100 kilometers in 1h. 2m. 35s. Such were the results of the "tour des Ardennes," which came off for decision yesterday, on Belgian ground, under the auspices of that go ahead body, the Automobile Club of Belgium, which has conferred fresh laurels in the motor world by its splendid organization of the event under notice. Once more the Panhard and Levassar were very much to the front, the general winner turning out in Jarrott, on one of the P.-L. celebrated vehicles, while second and third place were annexed by the Messrs. Jarrott, who steered the winning car, Gabriel, and the countryman of yours, Mr. Vanderbilt, driving the second and third. To M. de Crawez, also on a P.-L., fell the Raczynski cup, awarded to the driver of the fastest car on the initial 100 kilometers. A splendid achievement indeed. M. de Crawez might have carried the race together with the cup had it not been for a bad collision with another car, which quite disabled him.

The quadrangular course, which has been termed the "National Autodrom," was voted a rare good idea, combining as it does the good points of the road and circular path, only the curves were rather too sharp, and the laps should be extended from 80 kilometers or so to 200 kilometers. Then we shall have the ideal autodrom. The winner had rare good luck throughout the day. Its consummation amounted to 200 liters of gasoline about.

Appended are the most noteworthy results:

HEAVY CARS.

1. Jarrott (Panh.-Lev.)	5h	33m	39s	3
2. Gabriel (Mors)	6h	2m	45s	1
3. Vanderbilt (Mors)	6h	22m	...	3

LIGHT CARS.

1. Rigolly (Gobron-Brillie alcohol)	6h	42m	16s	4
2. Guders (Panh.-Lev.)	7h	1m	46s	4
3. Edmond (Darracq)	7h	4m	30s	3

MOTORETTES.

1. Carre (Carre)	9h	34m	39s	.

RACZYNSKI CUP (100 KIL.).

1. P. de Crawez (Panh.-Lev.)	1h	2m	29s	3

The Baron de Caters has just tied Serpollet's famous 29 4-5 kilometer record, over the Ostende course. Before the season is much older we shall see some new wonders. The Deauville meet might be the occasion. The Deauville mile trials are a speed trial pure and simple. This fashionable and sportive fixture has a seaside resort for its venue and will be held early next month. It is the summer rendezvous of all the notabilities of the motor world, French and foreign. Given fair weather good races may be confidently expected.

GREAT RACING EXPECTED AT BRIGHTON.

The next racing event of importance in this country will be the meeting of the Long Island Automobile Club, which is to occur at Brighton Beach track on August 23. Owners of speedy machines are reminded that entries close within a few days. It is probable that the event of greatest interest will be the pursuit race, in which the cars will be placed at equal distances around the track, all being started at once. As the cars are overtaken and passed they are "down and out," retiring from the track at the first opportunity. It is hoped that this race will be run in two or more heats and a final. If such is the case the final should prove most thrilling and interesting. Suppose that Henry Ford, of Detroit, Alexander Winton, of Cleveland, and Fournier's Mors car have each qualified in their respective heats and are pitted in the final. Is there any doubt as to the quality and quantity of sport that would be provided for the onlooker? Such an event is more than possible, as the club is striving to bring it about.

Italian Vehicles Score Heavily.

A hill-climbing contest took place on July 27 near Mont Cenis, Italy, over a course of 14½ miles. The average grades was 10 per cent, but on some points of the road it reached fully 17 per cent. It may also be stated that the road was not in any too good condition, yet there were forty starters of the forty-two entered. The motor bicycle and tricycle event was won by Roselli, on a Roselli, in 1h. 8m. 44 1-5s. Cerrano, on a 9 horsepower machine of his own make, won the voiturette event in 41 m. 48 3-5 s. Storro on a 12 horsepower Fiat, won the light vehicle class contest in 31 m. 33s. A Peugeot 60 horsepower machine was second, 16 seconds behind, and two 20 horsepower Darracqs followed. Again the Italians were victors in the heavy class con-

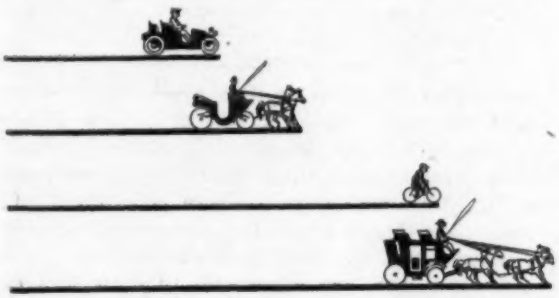
test; Lancia, on 24 horsepower Fiat, winning in 30 m. 10 2-5 s., while Renaux, on a 30 horsepower Peugeot, was second in 31 m. 21 s.

Cleveland Race Meet Programme.

Cleveland, O., Aug. 12.—The race committee of the Cleveland Automobile Club has announced the program for its first race meet to be held Tuesday, September 16, as follows: Five miles, steam vehicles of all weights; 5 miles, gasoline vehicles, 1,000 pounds or under; 5 miles, gasoline vehicles of 2,000 pounds or under; 2 miles, electric vehicles, all weights; 10-mile handicap for winners and seconds in events above named; 25 miles, all classes and weights; pursuit race, time limit 20 minutes; 10-mile handicap, open to the field. The handicapping for the two events of this class will be done on the ground after the judges have had an opportunity of sizing up the machines in actual races. The prizes will be handsome silver cups of appropriate design.

Automobile's Wide Margin of Safety.

Stopping tests, of which there have been a number, show that an automobile may be brought to a standstill more quickly than any other vehicle. The rela-



tive distances are illustrated by the diagram. The automobile, traveling at 22 miles, stopped in 31 feet; the trotting team, at 21½ miles, in 43 feet; the bicycle, at 20 miles, back-pedaling only, in 63 feet, and a four-horse tally-ho, at 17¼ miles, in 79 feet.

Stanley B. Arnold Was Not Arrested.

The transposition of two lines in last week's issue made it appear that Stanley B. Arnold, the 13-year-old youngster who drove a Locomobile around the course successfully, was the person arrested while passing through one of the towns on the north shore. The young gentleman calls attention to the error and requests that it be corrected. Incidentally he reports that he is putting water tubes in the boiler of his little machine which was described in MOTOR AGE 3 months ago and that he expects to completely change its appearance.

Heavy-weight Contest in Europe.

A heavyweight vehicle contest took place in Germany July 23-24, over a course about 107 miles, from Leipzig to Eisenach. There were seven participants, five of which finished the course. The roads were simply awful, rain having fallen for several days. A De Dietrich 9 horsepower machine, weighing 2,200 pounds, won in 12 h. 10 m. A little vehicle of Fahrenzenzfabrik-Eisenach, weighing but 550 pounds, of 5 horsepower, was second in 13 h. 16 m. A 10 horsepower machine of the same make, but weighing 3,600 pounds, was third, in 15 h. 33 m. A De Dietrich, weighing 6,600 pounds, with a 9 horsepower motor, was fourth, in 20 h. 43 m.; while a military vehicle, using alcohol, having a 10 horsepower motor, and weighing 4,950 pounds, was fifth, in 23 h. 30 m.

DeKnyff Honored by France.

With great satisfaction the French and many foreign friends of the automobile received the news that Rene de Knyff, the well known chauffeur, had been made knight of the legion of honor of France. The news appeared in the official French Gazette of July 28 and all the trade papers and many dailies gave the matter prominence. The history of De Knyff has been given at length in many of them. "The king of the chauffeurs," as he is called in France, has deserved this distinction, as he has been one of the principal factors of the superb progress of the automobile industry in France. It may be added that De Knyff is not a Frenchman but a Belgian.

Racing Car by Bowman.

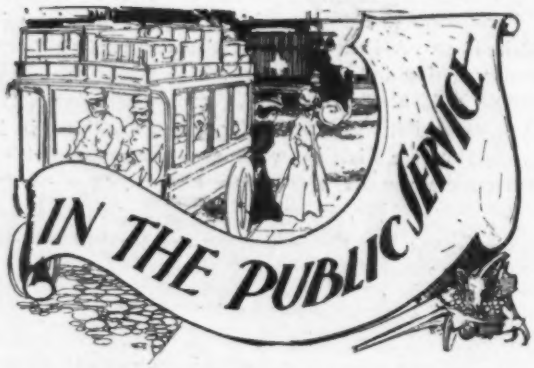
New York, Aug. 11.—Sidney B. Bowman is building a racing car at the machine shop of his storage station. It will be of 75 horsepower with a four cylinder vertical type engine and will weigh 3,000 pounds. Its completion is expected by October 1.

A cablegram from Paris, dated August 5, says: W. K. Vanderbilt, Jr., today broke the motor-car records for a flying mile and a flying kilometer on the road between Ablis and St. Arnault. He made a mile in 48 2-5s. and a kilometer in 29 2-5s. The times were taken by the official timekeepers of the Automobile Club of France. The previous mile record was held by Henri Fournier, whose time was 51 1-5s. and the kilometer record by Leon Serpollet, who covered the distance in 29 4-5s. Mr. Vanderbilt drove a Mors car.

It is officially stated that the net result of the Paris-Berlin road race was a gain of $21,600,000 worth of orders to the French manufacturers. Another result is that while the manufacturing centers were limited, they are now spread all over the country and such towns as Lyons, Marseilles and Rouen, which hardly had an automobile shop a couple of years ago, now have many large factories.

The Baron de Caters, a Belgian automobile enthusiast, made three attempts at the kilometer record on July 26 near Rostand. In the first he covered the distance in 31s., in the third in 30 4-5s. and in the second he equaled Serpollet's record of 29 4-5s. This time has since been beaten by Vanderbilt.

The Detroit race meet has been definitely set for September 19 and 20, at Grosse Point track.



SEE COLORADO FROM AN AUTOMOBILE.

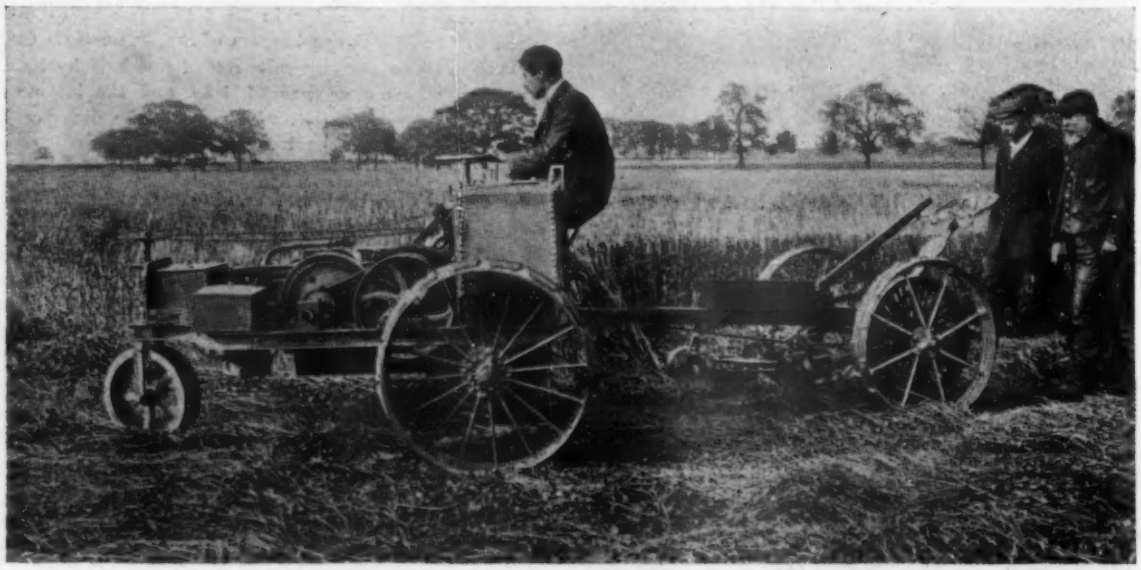
COLORADO SPRINGS, COL.—An automobile line will probably be running to many of the points of interest in this city and vicinity in less than a month. Irving Crane, who, in partnership with several others, is running the "Seeing All Denver" line in the Capital city, states that a representative of the company is in the east and expects to have automobiles here in a short time. The line, which will be run in Colorado Springs is backed by Mr. Crane, one Denver and two Chicago capitalists, who will also put on the same kind of service in every city of importance from here to the Pacific coast. Thirty-five wagons are already on the road and from five to ten of them will be used in this city. The vehicles will start from the center of the city, go to Iron Springs in Manitou and return, to Cheyenne canon and return, east to the Santa Fe depot and north through the residence district. Mr. Crane stated that they would not be run through the Garden of the Gods. Trips will take about 2 hours, and carriages will leave the central point every hour. The fare to be charged will be $1. "The success of this institution has been demonstrated in Denver," said Mr. Crane. "We find that we can run the vehicles 11 months in the year in Denver and we believe we can run them here probably 11½ months. By September 1 at least, the line will be in operation, and, mark my words, it will be a winner from the start."

The secretary of the Central Trades and Labor Council of Clay County, Ind., which organization has been active in the promotion of an automobile stage line, writes that it will probably be in operation very shortly. The company will be known as the Wabash Transportation Co. Its officers are: W. D. Vanhorn, chairman; G. D. Tubbs, secretary, and E. H. Evinger, assistant secretary, all of Terre Haute, Ind.

One of the most backward of the South American republics—Ecuador—is to be the first with an automobile service. Consul General Wither of that republic, stationed at New York, has obtained a concession for carrying the mails by automobile between Quito and the terminus of the little railroad constructed 90 miles inland from Guayaquil. The country between Guayaquil and Quito is a high table-land, flat as a board, and presents an admirable stretch for speeding an automobile. The inhabitants are ignorant even of railroads, and what they will do when the automobile passes is a question.

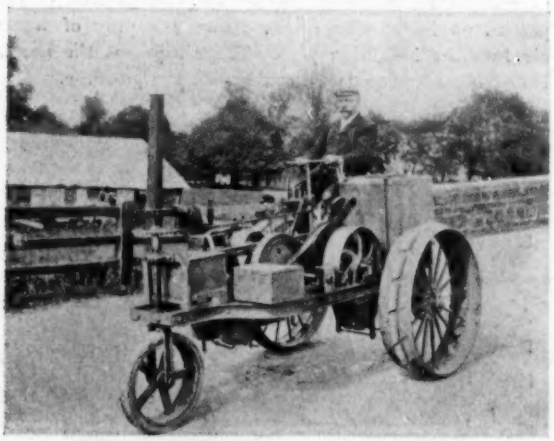
MOTORS FOR AGRICULTURAL USES.

An English manufacturer, Dan Albone, has been devoting time and attention to the production of self-propelled agricultural implements and has invented and patented what promises to be an economical and reliable agricultural motor. Albone is well equipped for his task. He is a practical motor-maker, and an agriculturist to boot. The Ivel agricultural motor is of the portable type, and constructed to draw mowers,



THE IVEL AGRICULTURAL MOTOR IN OPERATION.

reapers and other agricultural machinery. Apart from its full use, chaff-cutting, root-pulping and corn-grinding are well within its province. The motor is of 8 horse-power, double cylinder, water cooled. It has electric ignition, one speed forward and reverse, and the inventor claims that any intelligent man can drive it after a short tuition. Simplicity is the keynote of its construction. The engine is free, and when put in motion a friction clutch is employed to transmit the power through an intermediate shaft to the balance gear shaft of road wheels, by means of patent silent chains. The wheels have extra wide rims with grips to prevent them from skidding round. For traveling on the high road detachable rubber pads are attached to the rims of the wheels by means of thumb-screws. These rubber pads minimize vibration and lessen the noise. The cost of fuel in running the Ivel motor is considerably less than that of



Dan Albane and His Motor.

horse labor. An important trial of this agricultural automobile was held in a grass field, near Biggleswade. All present were much interested in the experiment, expressing themselves delighted with the motor, and congratulated Albone upon the success of his invention. Albone is more than a manufacturer, he is an enthusiast thoroughly convinced that the farmer's motor will become a real factor in the agricultural world, and that the Ivel is the pioneer of a great host of such machines.

Automobiles for Public Use.

BUTTE, MONT.—F. Jay Haynes, president of the Monida & Yellowstone Stage Co., has returned from the east, where he purchased an automobile for his company's use. Speaking of the enterprise, Mr. Haynes said: "I guess we will surprise some of the eastern tourists next year when they get to Monida. They will expect to climb one of the stage coaches and be driven by picturesque cowboys, but instead they will take seats in one of the newest and best apportioned of modern autos and make the park in pretty fast time. The government authorities were very anxious to find out if we were going to get our automobile service working, as they are going to bring their supplies in from the railroad with their own special autos. These vehicles are built for strength as well as for speed. This will not be for passengers, but will bring supplies to the posts in the park and as the roads are excellent there will be no difficulty in running them."

EAST ST. LOUIS, ILL.—A new automobile tally-ho, which made its first appearance on the streets on Monday, is being tested in the St. Louis-East St. Louis traffic by the Interstate Transit Co., which operates the automobile line over the Eads bridge. L. G. McNair, president of the company, stated Thursday that its work had so far proven satisfactory. Mr. McNair says it is the intention and object of the automobile company to operate an auxiliary line of through vehicles, which will carry passengers from Broadway and Washington avenue to the business center of East St. Louis. Gasoline or steam motors will be necessary for this, and the company is putting on the necessary equipment. The electric motor vehicles now in use will remain in service, but will make only the short trip.

GLOUCESTER, MASS.—A project which is being discussed in the city is that of establishing an automobile line to run from the depot to Annisquam during the summer and perhaps another to East Gloucester. The carriages used would be large open 'buses with seats on the sides such as have been operated in parts of the Boston Park system. The promoters of the scheme believe that it could not help being profitable during three months of the year.

HUTCHINSON, KAN.—J. P. Shunk has offered to take stock in a $10,000 company to operate an automobile street car service if four others will join him. With $10,000, it is estimated, three large automobiles could be procured. Each would carry about sixteen people. They would have regular routes, certain time for making certain points, just as the street cars are supposed to do.

SAULT STE. MARIE, MICH.—The ferry company will start an automobile service on both sides of the river to convey the passengers to the docks and from there up town. On the American side these will run from the corner of Ashmun and Portage and on the Canadian side from the corner of Brock and Queen streets.

PORTLAND, N. J.—The Portland Transit Co. has been organized to operate a line of automobiles from Portland to Camden, there to connect with the Dunkirk Mobile Transit Co. The capital stock is $10,000.

BOSTON, MASS.—Judge Knowlton, in the supreme court, has granted the petition for dissolution filed by the Boston Transit Co., which has been operating public automobiles in this city.

A Disadvantage of Obesity.

One day last week a number of alleged owners of automobiles were summoned before the board of review of Chicago to explain why the automobiles had not been mentioned in their schedule of taxable assets. Among them the wife of Henry Plohr, a saloon keeper at 2827 South Park avenue, furnished some amusement.

"Have you an auto?" asked Mr. West, the chairman.

"My husband, he have one; a tree-veeler, vat is no goot. He get him at the automo show."

"You say you haven't it now?" inquired the reviewer.

"No, my husband, he vas out riding mit another woman and it busted. She was lean; if she had been fat like me it vould have killed her."

At Adriennes, near Brussels, last Thursday, there was a race of 512 kilometers (317 miles) without stopping, over a circular course. A machine driven by Jarrott was first, covering the distance in 5 hours and 53 minutes. Gabriel was second and Vanderbilt third. Vanderbilts' time was 6 hours and 23 minutes.

The establishment of the Manitowoc (Wis.) Cycle Works has been closed under a chattel mortgage and the goods have been stored by the sheriff pending orders for their disposition.

The A. B. C. of the Gas and Gasoline Engine

CONTENTS OF PREVIOUS SECTIONS.

Section 1. Principle of gas and gasoline engines similar.—Introduction of two cycle engines.—First gas engines used.—Three types and their subdivision.—Requirements, gasoline or gas, mixture of air, and electric spark or hot tube.—Necessity and admission of air.—Principal parts.—Accessories.—Water jacket.—Two cycle engine—what it is.—Parts of two cycle engines and their operation.—Admission valve, inlet passage, igniter and exhaust port and their purposes.—Operation of two cycle motors.—How charge is taken.—Object and operation of baffle plate.

Section 2. Four-cycle engine.—Operation and principal parts.—Description of cylinder, valve chamber, ignition device, valves, piston, piston rings, wrist pin, connecting rod and valve stem.—Why valve chamber is used.—Purposes of the piston ring.—Auxiliary exhaust port.—Why water jacket is necessary.—Heat due to explosion.—Sight feed lubricator.—Position and functions of valve chamber.

Section 3. Uses of two-cycle motor and complete description of the operation of all its parts.—Starting the engine.—Methods and devices used in starting engines of all descriptions.

48. Figure 12 is an illustration of the general arrangement of a stationary engine ready for work. An important part of the mechanism is what is commonly known as a "two to one" reduction gearing. It is shown in the drawing by letters P and G. Various forms of this mechanism will be illustrated and described later in this article, but it may be said briefly that its purpose is to operate the exhaust valve and the pump which supplies gasoline to the engine. It derives its name from the fact that it is so made that it will open the exhaust once to every two revolutions of the fly wheel.

49. A is the inlet valve chamber. B is a bracket, fastened to the base of the engine, which carries one end of a plunger rod S. On an extension of the crank shaft, projecting through the journal bearing J, is a pinion P. This meshes with the gear G. On the other side of the gear (for plainer view see G, Figure 13) and fastened to the same shaft is a cam C which, as it is rotated, comes in contact with the roller R and pushes the plunger rod S outward. This forces the end of the plunger rod into contact with the valve stem V and opens the valve.

50. The gear G is carried on a shaft in the bracket N, which is fastened to the base. On the outer end of this shaft is an eccentric X, attached to which is a rod Y, which actuates the pump U. The pump draws a supply of gasoline from the tank 4 through the suction pipe 5 and check valve 6, into the connecting pipe Q. The oil passes through the pump, into the pipe Z, thence to and through the needle valve L and through the nozzle F into the induction pipe H. Here for the moment we will leave it.

51. The induction pipe H has an extension M, which extends into the base of the engine. The action of the piston, on its suction stoke, draws a supply of warm air into the induction pipe. The air passes the nozzle F and there commences to mix with the gasoline.

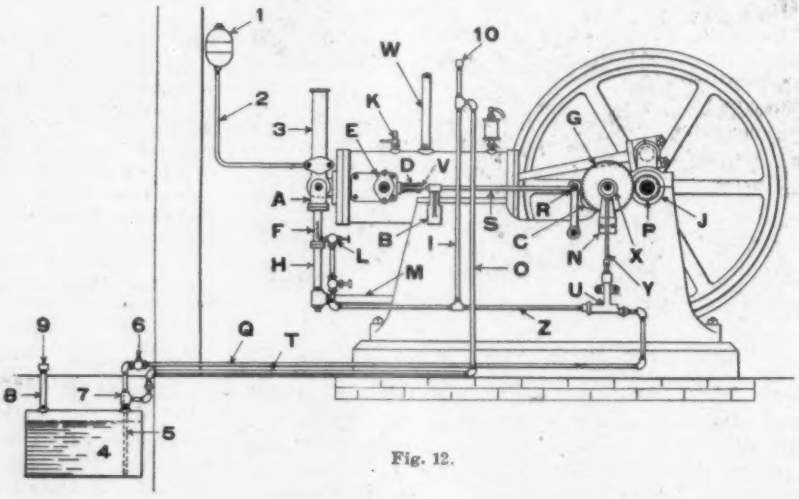


Fig. 12.

52. The pump U is so adjusted that every time the piston starts on its suction stroke a charge of gasoline is ready to be drawn in and the pump has commenced to force it into the pipe Z from which point its progress has already been traced. In the event of more gasoline being pumped than can pass the nozzle F, or, in other words, more than is required to operate the engine, it is forced up the pipe I and returned by the pipes O and T to the tank. It passes through the combination fitting 7. In the pipe Q, at 6, is a check valve which opens only on the suction stroke. At the top of

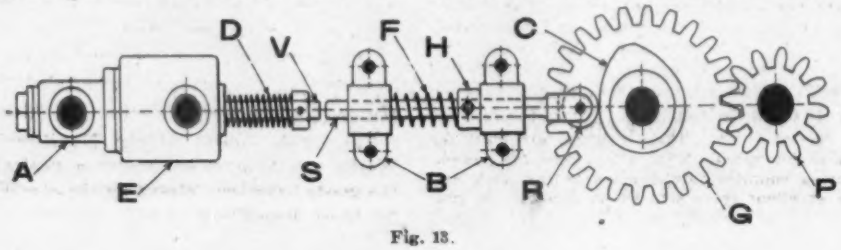


Fig. 13.

the pipe I is a cap in which is a small opening for a vent to prevent a vacuum forming in the overflow pipe O. To avoid confusion the exhaust pipe connection to the exhaust opening E is omitted.

53. The hot tube form of ignition is shown, that being the one generally used on stationary engines. The chimney is shown at 3 and the hot tube proper is inside of it, as is the burner which supplies the heat to keep it incandescent. A small gasoline tank 1 is attached to some convenient support and should be from 3 to 4 feet above the burner and connected with it by the pipe 2. The main gasoline tank 4 which supplies the fuel for the engine is usually located outside of the building as indicated by the drawing.

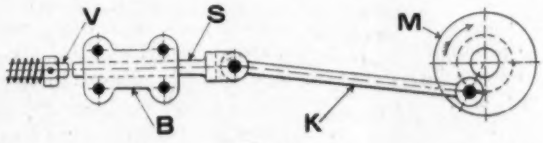


Fig. 14.

54. The relief cock K and water pipe connection W, whose functions were described in paragraphs 32 and 30 respectively, are shown, as is the sight feed pressure lubricator for automatically oiling the cylinder and piston. For details of operation see paragraph 31.

55. The succeeding figures illustrate forms of two to one reduction gearings used to operate the valve or valves of a four-cycle engine as described in paragraph 42. Figure 13 shows one of the simpler forms. A is the inlet valve chamber which is attached to the valve chamber E of the engine. Reference to Figure 12 will show its exact location. Except when the exhaust valve is in operation it is held closed by the spring D. The plunger rod S is carried in the brackets B and, except when pressed forward by the action of the cam C, is held away from the valve stem D by the spring F. The cam C, as previously described, rotates with the gear and when its nose is in contact with the roller on the end of the plunger rod forces the rod forward against the valve stem, compresses the spring D and

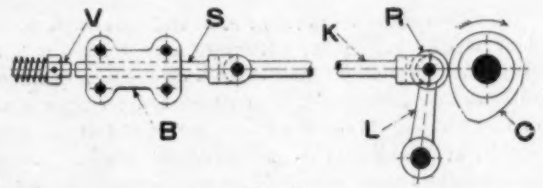


Fig. 15.

opens the exhaust valve inward. As the exhaust valve is required to open only once to every two revolutions of the engine, the gear G is made of such size that it will rotate only once while the pinion P, which is located upon an extension of the crank shaft of the engine, rotates twice.

56. In some form of the four-cycle engines both inlet and exhaust valve are mechanically operated, in which case two sets of valve operating mechanism are necessary. The second cam is placed upon the same shaft, the same gear of course operating both.

57. Fig. 14 shows form of mechanism in which the disk plate M, instead of a cam, is attached to the two to one gear shaft, the plunger rod S being supported by a bracket B and operated by means of connecting rod K. The plunger rod has a great deal longer move-

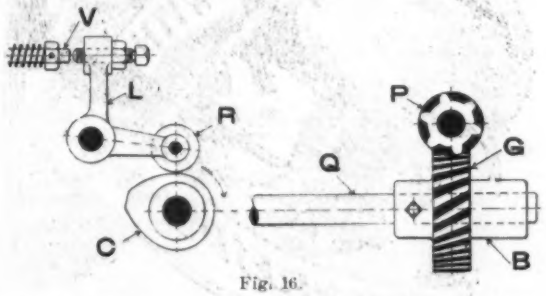


Fig. 16.

ment than that required with the cam device, but is in engagement with the valve stem only long enough to insure its opening and closing at the right time.

58. Still another device is shown in Fig. 15. One end of the connecting rod K is carried by an oscillating lever L, which is supported at its lower end by a stud. The action is very similar to that described in Fig. 13.

59. Fig. 16 is a form used when the engine is equipped with a secondary or lay shaft, as shown at Q in the right hand view. The introduction of this shaft is due to the location of the valves in the cylinder head and parallel with the crank shaft, or at right angles with the axis of the cylinder. The shaft Q is carried in bearing B at its crank shaft end and is operated by a pair of two to one spiral gears P and G. The left hand view shows the cam C and bell crank lever L with cam roller R, which operates the valve stem V, as before.

60. Fig. 17 shows an end view, with cylinder and valve chambers in cross section, of an engine with both inlet and exhaust valves mechanically operated, as is frequently done with large engines. G is the cylinder and A and E the inlet and exhaust valves. L is a rocking lever carried on a fulcrum B, with cam roller

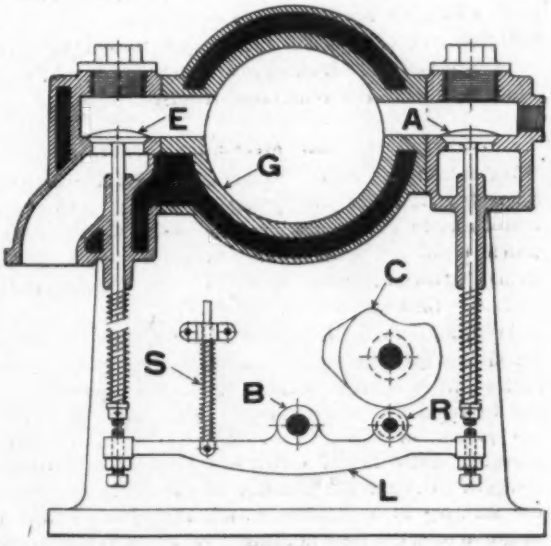


Fig. 17.

R. The cam C has raised and depressed portions as shown. The raised part operates the exhaust valve E, and the cam roller R is forced into the depression in the cam by the action of the compression spring S, thus operating the inlet valve E.

(To be Continued).



MOTOR AGE will be pleased to publish communications of general interest and to reply in this column to questions of the same character in such manner as to furnish the desired information in the simplest and most direct form. Requests for articles on any specific subject will be given as early and careful attention as possible.

Drawings for Transmission Gear.

Lorrain, Ohio.—Editor MOTOR AGE: Can you inform me through your correspondence columns where I can get drawings or other information from which I can build a speed change gear transmission, with two speeds, forward and reverse, without internal or bevel gears? The French type, with sliding gears, is preferred if possible. I have now a speed change gear of the sun and planet type and it is not entirely satisfactory or suitable for hard usage.—Amateur.

MOTOR AGE of July 10, 1902, pages 10 and 11, gives fully dimensioned drawings of such a transmission which will suit the conditions required.

Atmospheric and Mechanical Operation.

Warsaw, Wis.—Editor MOTOR AGE: Having been an interested reader of your paper for the last two years, would like to ask a question with regard to a point on which I am not quite clear. What is meant by the terms "atmospherically operated" and "mechanically operated" inlet valves?—M. E. B.

An "atmospherically operated" inlet valve is one in which the valve is forced inward against the pressure of its spring by the pressure of the atmosphere, tending to replace the vacuum in the cylinder, caused by the piston on its outward stroke. A "mechanically operated" valve is one which has a spring of sufficient strength to resist the pressure of the atmosphere upon the forming of a vacuum within the cylinder, and is operated by some form of cam device, which at the proper time lifts the valve, the pressure of the atmosphere then forcing the air or gas into the cylinder. This form of valve is generally used on large engines where the weight of the valve is so great as to produce a throttling action, and tends consequently to reduce the volume of the charge entering the cylinder below its normal capacity. It is also used in connection with some form of governing device to regulate the volume of the charge entering the cylinder.

Lubricating Oil Causes Short Circuit.

Sterling, Ill.—Editor MOTOR AGE: Can you suggest any remedy for the trouble which I have with the spark plug of my bicycle motor. It is located in the cylinder head and would, if the motor was vertical, be the same; that is, it stands straight up in the cylinder head. After running the motor for a few miles it refuses to work, and on taking out the spark plug I find it covered with lubricating oil, which evidently short circuits it and consequently renders it inoperative.—P. R. Y.

Have a small extension piece made of hexagon steel to project about 1½ inches above the cylinder head, and to screw into the spark plug opening. Have the upper end of this piece threaded for the reception of the spark plug, and a hole through the piece the same diameter as the bottom of the thread on the spark plug. This will probably remove the trouble and secure certainty of ignition. The trouble is doubtless caused by lubricating oil splashing on the plug, which may be removed by the method suggested.

Leaky Unions in a Steam Carriage.

Waukegan, Ill.—Editor MOTOR AGE: I am having trouble with leaky joints on my steam automobile and would like to know if you can suggest any remedy. There are five or six union connections in the piping between the gasoline tank and the burner which have been giving trouble. They are supposed to be what are known as ball joint unions and not to need any packing in them. I have tried both rubber and asbestos, but without success.—W. M. T.

Get a small piece of sheet lead 1-16 of an inch thick, and cut from this circular washers just large enough to fit into the threaded female part of the unions, with hole in the center of each a trifle larger than the hole in the union. This will make a permanent and effective cure.

Carburetor Produces Frost and Vaseline.

Titusville, Pa.—Editor MOTOR AGE: I have a float feed carbureter of French make which I am using on my gasoline automobile, with which I am having more or less trouble. When the motor is run at full speed for any great length of time, a coating of frost is formed on the outside of the body of the carbureter, which seems to prevent the proper amount of gasoline from being taken up by the air, and the motor consequently does not give its full power. Also, after the carbureter has been in constant use for several weeks, a deposit of a substance resembling vaseline, only of a pale green color, is found in the float chamber, and to such a depth as to interfere with the proper working of the float. I should be glad if you could give me any information as to the cause of these troubles and the best way to remedy them.—P. S. A.

The coating of frost formed upon the outside of the carbureter is due to the fact that the area of the air opening or inlet to the carbureter is smaller than the

inductive capacity of the motor, thereby producing a partial vacuum and too rapid evaporation of the gasoline. The other trouble is caused by using too low a grade of gasoline for one thing and the too rapid evaporation of the gasoline, which takes away the more volatile part and leaves the heavier or gummy portion of the oil behind. The deposit found in the float chamber is actually vaseline, which is a petroleum product, although it is a rather expensive way of producing it. The green color is due to a chemical action between certain elements in the gasoline and the brass of which the carbureter is made. It is, in fact, arsenate of copper and extremely poisonous.

Leaky Valves or Piston Rings.

Minneapolis, Minn.—Editor MOTOR AGE: In answer to the letter of B. E. N., of Milwaukee, which appeared in MOTOR AGE of July 24, leaky valves are sometimes mistaken for leaky piston rings. I had the same trouble as that of which he complains in turning over an engine and holding it on compression. I heard the gas escape and was so sure that it was a case of leaky piston rings that I made new ones. I then knew they were perfect and that my cylinder was true, but still the gas escaped and I could get no relief from the trouble until the valves had been reground. As B. E. N. has made new rings I think the trouble is with the valves. If, however, they prove to be all right his cylinder cannot be round. Sometimes hard spots will be found in the casting, so that unless the stiffest kind of tools are used in boring the cylinder will have high spots, in which case the best rings in the world will not make it hold gas.—Yours, etc., Oscar M. Bergstrom.

The Holsman Automobile.

Chicago, Ill.—Editor MOTOR AGE: I beg to offer a correction of your statement regarding the Holsman automobile in your issue of July 31. Of course we are not concerned as to whether the transmission is new, but only as to whether it is practicable, durable and a sensible means of transmission. The rope transmission in general is not new and its merits are very well known among engineers. We have found in studying the history of automobiles that a great many designers, like Max Hertel, were aware that some form of band or belt transmission would be the most suitable for automobiles, and have tried to devise a mechanism for the use of the rope or belt. After giving our design a year's test we are so sure of its all-around practicability that we invite you to call and make whatever test you deem fit, if you are impartially interested in the scheme, as in truth you may have intended to indicate in the item referred to in your journal.

To use our design of rope transmission it is not essential to dispense with the differential gear. We tried the differential gear and we have found that the disadvantages of the differential gear are several and we find no particular disadvantage in dispensing with it. The operator sets the tension of the ropes a little more than necessary to drive the vehicle and as easily as he could set the ordinary friction clutch with a lever. Upon turning a corner one of the ropes tightens in the groove a little more than when running in a straight course and the other rope loosens in the grove, and corners are turned without any skidding and without the necessity of "throwing the mechanism out of gear." We have found that with this transmission device the balance of the application of power to the two rear wheels is such that the automobile will follow the ordinary wagon track in the ordinary dirt country road without placing the hand on the steering lever. As such a hasty statement from such a worthy source might prove of considerable damage to us, we think it only proper that you should make an examination for yourselves and correct the impression you have given.—Yours, etc., The Holsman Automobile Co.

Muffler for Motor Bicycles.

Pekin, Ill.—Editor MOTOR AGE: Can you give me any information with regard to constructing a muffler for a bicycle motor. I have tried two or three of different makes, but they all seem to have too much back pressure. Any advice you can give me in this matter through the columns of your paper will be greatly appreciated.—J. H. M.

A muffler which will in all probability fill the requirements of the case was illustrated and described in the last issue of MOTOR AGE, August 7. It is simple and compact and is claimed to be practically without back pressure.

Plan to Avoid Misfires.

Everybody knows that the most common cause of misfiring is the presence of oil on the contact breaker, but many riders shirk the task of cleaning it off because of the fancied trouble involved. A small stiff brush, such as an office paste brush, should form part of the equipment of every toolbag. By using the waste gasoline tap a little gasoline can be run out of the carbureter on to the brush, with which the whole interior of the contact breaker, especially the platinum tips, can be expeditiously cleaned. Failing such a brush, a card passed between the tips when they are held together will wipe off any oil upon them; but in doing this care must be exercised lest fragments of the card be torn off which, adhering to the tips, destroy metallic contact.

Agitate the Gasoline Occasionally.

A sluggish motor may often be made to go well by "waking up" the gasoline. We were recently compelled to ride 12 miles with a broken pedal chain and the motor threatened to come to a full stop when halfway up some of the hills, but by pulling at the handles so as to lift the front wheel and letting it down with a jerk we succeeded in shaking the gasoline to such good purpose as to compel the surface carbureter to form gas so rapidly that the machine climbed every rise. The dodge is worth trying during track races in which pedaling is prohibited after the start, says a writer in Motor Cycling. When the motor has a fit of the sulks a few vigorous jerks of the front wheel may encourage carburation with the same accelerating effect upon the pace as a rough road produces.

Principles and Operation of an Induction Coil

PART II.

The first paper having described in detail the principle, the object of this article will be to describe the construction of the two forms of induction coil and endeavor to make plain their method of operation.

Fig. 9 is a vertical longitudinal section through a coil, of the simplest form known as the "primary spark coil." It consists of two principal parts, a core, made up of a bundle of soft wrought iron wires and a coil around this core, composed of from three to five layers of turns of insulated copper wire, varying from No. 16 to No. 10, B. & S. gauge, according to the battery conditions under which it has to operate. The core may vary from ¾-inch diameter and 6 inches long to ¾-inch diameter and 12 to 15 inches long, depending upon the intensity and capacity of the spark required. Reference to the drawing will show that the core M has upon its ends wood or fibre washers, W. They may be square or round. Upon the portion of the core between the washers is a paper tube T, upon which the wire forming this primary winding is wound. The ends of the wire forming the coil and shown at 1 and 2 are connected to the binding posts or terminals indicated by the letter P, with circle around it, and located on top of the washers, W. The wire forming the primary winding is usually provided with an outer casing, as shown at V, to protect it from water and grease.

The form of induction coil above described is generally used for ignition purposes on gas and gasoline motors fitted with the mechanical make and break form of spark, which is located within the combustion chamber of the motor itself.

Figure 10 shows the Rumkorff or jump-spark form coil. It is composed of an iron core and a primary winding similar to that described in conjunction with Fig. 9, with the addition of an outer layer of turns of wire. This wire, of very small size, is known as the secondary winding, varying in diameter from No. 36 to No. 40, B. & S. gage, and in length from 5,000 to 10,000 feet. In the drawing the induction coil is shown equipped with an electro-magnetic make and break or vibrator device, which is one of the forms in use for ignition purposes. The other form, known as the plain jump-spark induction coil, has a mechanically operated make and break device attached to the motor to operate the coil.

The arc or spark produced at the breaking point of the electrical circuit in which the primary winding of the coil is connected is not utilized for ignition purposes in this type of coil. When the circuit is broken the sudden reaction or backward flow of the lines of force or magnetic flux in the iron core produce an induced current in the secondary winding, but in the opposite direction to that of the battery current. This induced current is of so much greater intensity and velocity than that induced in the primary winding by this same reaction that the arc or spark induced in the secondary winding of the coil will jump across a space, from one end of the wire to the other, varying from ⅛ inch to as much as 8 or 10 inches in length, dependent upon the length of wire in the secondary, the electromotive of the battery and the frequency of the interruptions or number of times per minute the electric circuit is made and broken.

In the drawing M is the core, P the primary winding and S the secondary. The two coils are held in place upon the core by the washers, W. The primary wire, P, is wound over a paper tube, T, and the secondary wire, S, is insulated from the primary wire by a mica insulating tube, U. The coil proper is enclosed in a wood case, A.

The terminals or binding posts on top of the case, A, are connected with the ends of the secondary wire, 6 and 7. The terminals are plainly indicated by the letter S, with circle around it. In the base, B, of the coil case is the condenser, C, an essential feature of this form of coil, which utilizes the induced primary current to produce a greater reactive energy in the secondary winding.

At the right-hand end of the coil and outside the casing, A, is located the electromagnetic vibrator or trembling device, which automatically makes and breaks the primary circuit. The end I of the primary is connected with the contract screw K through the bracket N. The spring H, carried by the bracket G, with screw J, is connected with the terminal or binding post immediately beneath it by the wire 5 through the bracket G. The end 2 of the primary is connected

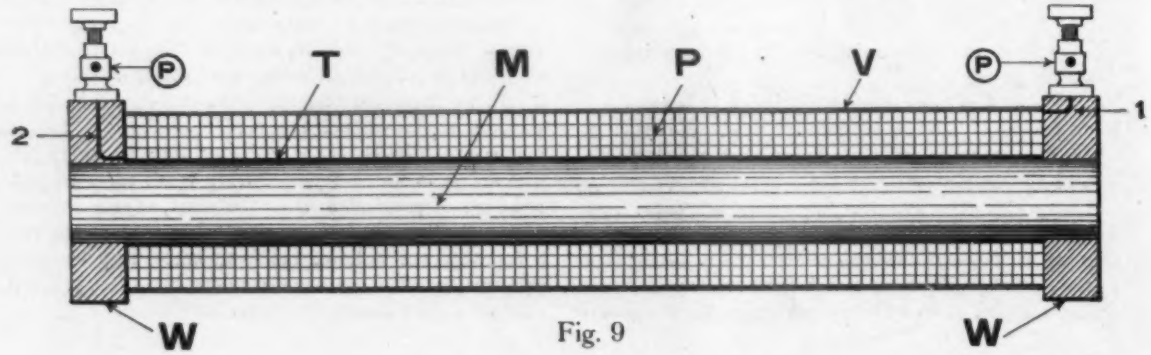


Fig. 9

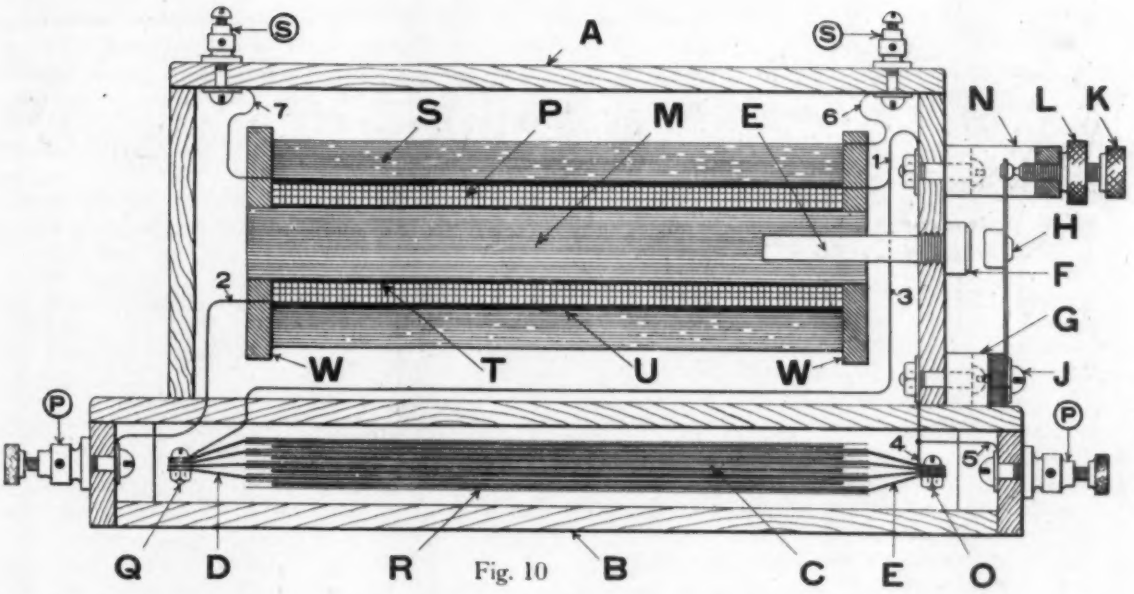


Fig. 10

with another terminal or binding post at the other end of the base of the coil. The terminals or binding posts are clearly indicated on the drawing by the letter P, with circle around it. The condenser, C, is connected across the contact points of the screw K and the spring H by the wires 3 and 4 and screws Q and O. The condenser is composed of a number of sheets of tinfoil laid between sheets of special insulated paper, with the opposite end of every alternate sheet of tinfoil projecting from the paper insulation, as shown. These projecting ends are connected together and to the wires 3 and 4 to the contact breakers K and H, respectively, as previously described.

When the coil is connected in or forms part of a closed electric circuit by means of the terminal or binding posts, on the base of the coil, the current flows through the primary winding, P. This instantly produces a high degree of magnetism in the core M and the pole piece F becomes strongly magnetic and attracts the iron button of the spring H. This draws the spring H away from the end of the screw K, and in consequence breaks the electric circuit. This results in the demagnetizing of the pole piece F and the consequent return of the spring H to its normal position in contact with the end of the screw K. So long as the electric circuit remains closed this operation is repeated at a very high rate of speed. The effect of this continuous operation of the coil is to produce an intermittent current in the secondary winding of high intensity and velocity. If wires are placed in the holes in the small terminals or binding posts on the top of the coil and brought within a short distance of each other a stream of sparks will pass from one wire to the other in a peculiar zig-zag manner and emit a loud, crackling noise, accompanied by a peculiar odor, caused by the formation of ozone through the electro-chemical action of the spark.

Under ordinary circumstances the arc or spark which occurs on the breaking of the contact between the platinum points of the screw K and spring H would not be utilized, but by means of the condenser in the base, which is connected to these parts, as before described, the static charge of electricity generated by this action is stored in the condenser. When the contact is again made this stored electric energy is given up or discharged by the condenser and flows through the primary winding of the coil in connection and in the same direction as the battery current and increases the magnetic effect of the core M enormously.

When the coil is used in connection with a gas or gasoline motor a form of ignition device known as a spark plug is used. This is connected with the secondary terminals and screwed into the combustion chamber of the motor. A form of circuit breaker upon the motor is used to make and break the electric circuit at the desired point, and the resulting arc or spark inside the combustion chamber ignites the charge of vapor.

This style of coil is also used without the electromagnetic vibrator, and a mechanical make and break device, actuated by the motor, is used instead, producins as a rule only a single spark.

Graham Murray, an Englishman, relates that he has experienced beneficial results by having the platinum stud of the trembler of his motor bicycle replaced by better quality obtained from a jeweler. The platinum fitted in the ordinary way is, he affirms, of inferior quality, and the better quality not only gives better sparking results, but, owing to being much harder, will stand more wear. Presumably, Murray had not only the platinum of the trembler, but the tip of the screw as well, replaced.



Gentlemen connected with the International Motor Car Co., of Toledo, have admitted within the last few months that the demand for gasoline carriages, as exemplified at the Chicago show, was a revelation to them. The company had, a few months earlier, commenced preparations for the production of cars of this class and exhibited at the show the first sample, though confessing that it did not expect to be ready to deliver machines for 3 or 4 months. Evidently the samples pleased prospective purchasers and convinced them that the company intended to manufacture matchines which would be both reliable and speedy. The demand was almost instantaneous. Under similar circumstances many manufacturers have placed machines in the field before testing them sufficiently. The International company, however, declined to be drawn into an error of this kind, determining that not a single car should leave the factory until every essential detail had been tested and found reliable.

Under these circumstances nearly 5 months elapsed before the first vehicle was shipped. It was consigned to Mr. Donald, president of the Chicago club, who received it about 3 weeks ago. Since then three other samples have reached Chicago. Many features of their construction are new to American made machines and many well posted people in the automobile line have pronounced them the handsomest vehicles so far produced in this or any other country.

The general lines of the car, as well as the details of its internal construction, are shown in the accompanying drawings which have been specially and carefully prepared by Motor Age. The illustrations show a side sectional elevation and a plain view with the body removed.

Fig. 1 shows the location of the motor, transmission gear case, controlling levers and gasoline and water tanks. Fig. 2 shows the arrangement of parts not clearly shown in Fig. 1.

The radiator or water cooling coils are located in front, as usual in this type of machine. The gasoline tank is under the seat and the water tank in the rear portion of the main frame, directly below the tonneau. There are three forward and reverse speeds, controlled by a single

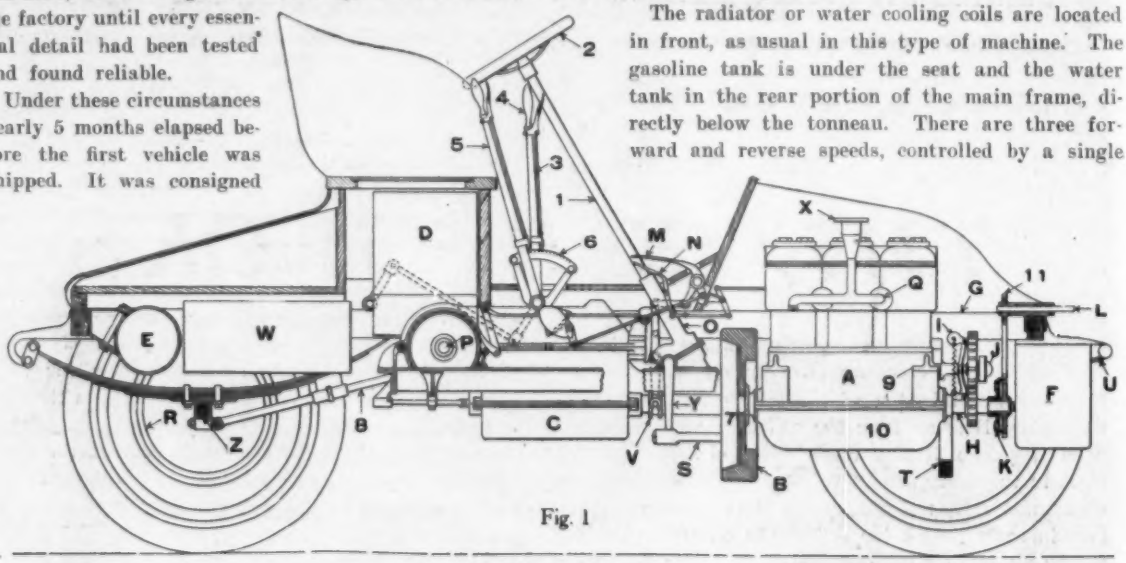


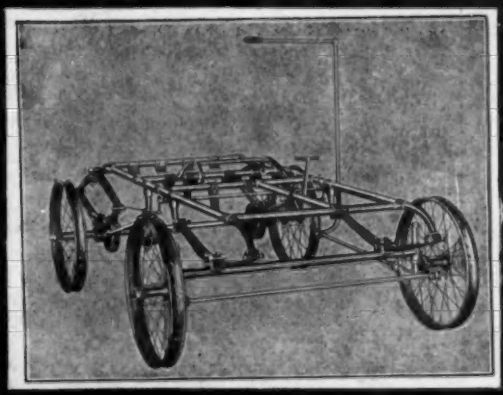
Fig. 1

A—Motor.
B—Fly wheel.
C—Transmission gear case.
D—Gasoline tank.
E—Muffler.
F—Radiator.
G—Main frame.
H—Motor shaft.
I—Governor for vaporizer.
J—Contact breaker.
K—Starting sprocket clutch.
L—Starting crank shaft.
M—Motor clutch pedal.
N—Throttle pedal.
O—Steering post bracket.
P—Countershaft.
Q—Water pipe connections.
S—Steering rod.
T—Front axle.
U—Front spring support.
V—Clutch fork and sleeve.
W—Water tank.
X—Water funnel.
Y—Steering lever.
Z—Rear axle.
1—Steering post.
2—Steering wheel.
3—Change speed lever.
4—Reverse control in handle.
5—Brake lever.
6—Quadrant.
7—Male part of fly wheel cone friction.
8—Distance rods.
9—Motor feet.
10—Crank chamber removable base.
11—Starting sprocket.
12—Clutch member.
14—Sub frame.
15—Spark plug openings.
16—Exhaust valves.
17—Inlet valves.
18—Dynamo.
19—Steering knuckles.
20—Rear wheel brake shaft.
21—Knuckle joints in countershaft.
22—Driving sprockets.
23—Driven sprockets on rear wheels.
24—Brake on countershaft.
25—Rear wheels.
26—Motor valve gearing.
27—Exhaust pipe to muffler.
28—Steering knuckle connecting rod.
29—Front springs.
30—Front wheels.

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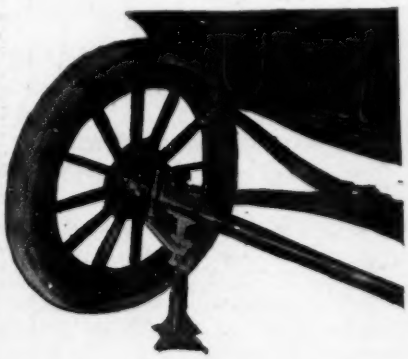


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lever. The countershaft, on which the driving sprockets are located, has a universal joint at each end near the outer bearings, to prevent any binding or stress on the same due to distortion of the frame when traveling over rough roads. The speed transmission gear is enclosed and runs in oil.

The motor is of the three cylinder type, with cranks at 180 degrees, cylinders 4¼x5¼, and is of 16 horsepower. The power is transmitted to the speed transmission gear by a flywheel cone friction clutch, and from this to the countershaft by means of bevel gears. The speed of the motor is controlled by a throttling governor attached to the cam shaft, and a hand lever located upon the steering wheel controls the spark lead.

The main frame of the vehicle is of ash, interlined with steel flitch plates. The rear wheels are driven by

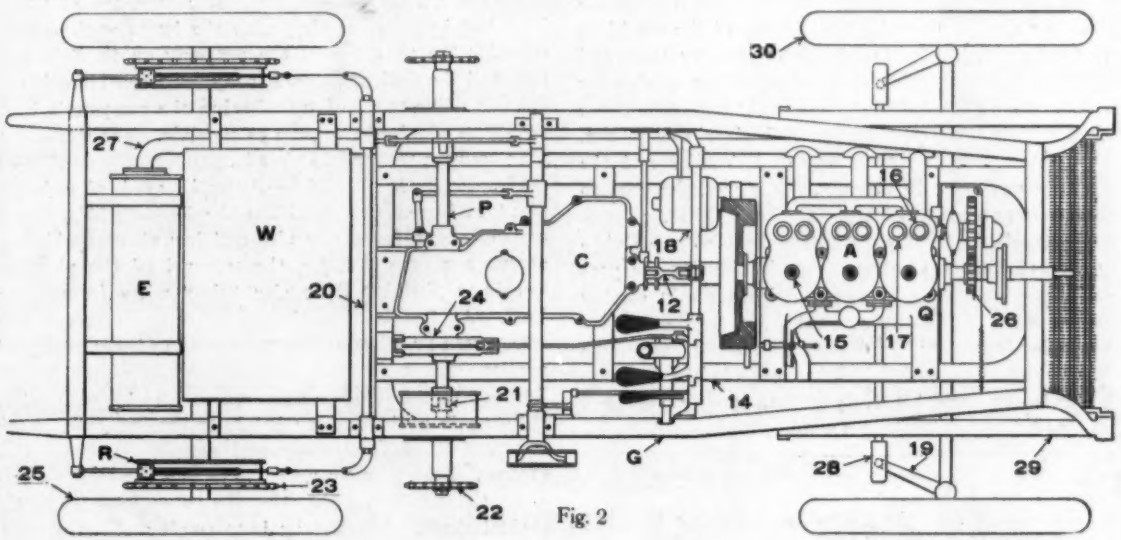


Fig. 2

roller chains, 1¼ inches pitch and ⅝ inches wide. The driving sprockets, which are bolted to the rear wheels, are provided with brake drums 1¾ inches face, controlled by a hand lever. The mixture is supplied to the cylinders by a float feed carbureter through a three-way induction pipe attached to the motor.

The accompanying table will give a clear and concise guide to the general construction of the machine by reference to the letters and figures in the drawings.

COLUMBUS AS MANUFACTURING CENTER.

Columbus is in the production race and two factories, those of the Motor Truck & Vehicle Co. and the Columbus Motor Vehicle Co., are already in active operation, while a third company, the Standard Automobile Co., expects soon to have its products on the market. W. H. Edwards also contributes to the automobile industry of the city, building engines and making gasoline motors. The Motor Truck & Vehicle Co., of which O. G. Roberts is manager, was started, according to a local paper, as a partnership in 1899, and was incorporated in March, 1901. Much experimental work was necessary before the special feature of their machinery were perfected. Its first motor truck was placed in service in December, 1899, and was used during the holidays by the American Express Co. for its extra holiday business. After 3 months' use it was returned to the shop and some improvements made.

The first sale was made to Schoedinger & Fearn in July, 1901, another to McAllister & Mohler in December, 1901, and a third to F. O. Schoedinger last March. It has already been proved from careful records kept for six months of the one in the possession of Schoedinger & Fearn that one of these machines will do the work of three teams and cover in delivery 55 miles a day, while the average daily expense is 62 cents.

This company also manufactures a twelve passenger break or tally-ho and a twelve passenger wagonette. One of these large convertible breaks and delivery wagons recently completed is for a hotel in Denver. Work has just commenced on a twelve passenger bus and a twelve passenger wagonette.

The Columbus Motor Vehicle Co., of which J. F. Runkle is manager and C. W. Groff secretary, was organized as a partnership in 1899, and incorporated November, 1901, and after much preliminary experiment opened its factory in January.

The company manufactures two styles, a pleasure car on the phaeton order, and a large touring car, both run by gasoline engines. Everything about these cars is made in the factory except the wheels and tires. The company employs fifteen men now, but expects before long to enlarge the force to between forty and fifty. The capacity of the plant will then be two vehicles a week. No vehicles have as yet been sold out of the city.

The Standard Automobile Co., of which C. A. McCarthy is the general manager, was incorporated April 1, 1902. It has sold no machines yet, but is putting up a delivery wagon run by a 5 horsepower steam engine. This wagon weighs 1,200 pounds and is capable of car-

rying 1,000 pounds. The company buys the different parts of this machine and assembles them, but is making outright a two-passenger vehicle of the runabout style. The bodies for these vehicles are to be made by the Columbus Body and Seat Co. Plans for a factory are being made.

PHENOMENAL SALES OF OLDSMOBILES.

Cleveland, O., Aug. 12.—R. R. Owen, manager of the Ohio Oldsmobile Company, has just made his two hundredth sale to a Clevelander this year. In the entire state he has sold over 500, a portion of them being to agents in larger cities.

Mr. Owens claims that every one of these machines is in almost daily use and there are seldom over two or three in the repair shop at one time, and most of these are for trivial repairs, made because the machines are left at the shop during the day. Many of the machines have been given the hardest kinds of country tests and without exception they have stood up under service for which they were scarcely designed. Last week Mr. Owen made a trip to Wellsville, on the Ohio river, and return, in one day. Distance each way is 105 miles and the down trip was made in 7 hours. This week he goes to Pittsburg over a road which is notoriously hilly.

Secretary E. L. Sanderson, of the Beardsley & Hubbs Mfg. Co., of Shelby, Ohio, has been in the city the past week arranging for an agent and incidentally closing up a few sales on his own account. Mr. Sanderson is a former Clevelander and he has many friends here, some of whom he has succeeded in interesting in the Durling. Mr. Sanderson says his factory will shortly spring a 1903 model which will show a whole lot of new features.

EXPORTS OF AUTOMOBILES AND BICYCLES.

Washington, D. C., Aug. 6.—The following is a list of exports of bicycles and automobiles for the week just ended from the port of New York:

Argentine Republic—Bicycles and material, $130.
Amsterdam—Bicycles, nine cases, $170; bicycle material, two cases, $43.
Antwerp—Bicycles, one case, $33.
British Guiana—Bicycle material, two packages, $58.
British West Indies—Bicycles and material, eleven packages, $109.
Berlin—Bicycle material, one package, $10.
British East Indies—Bicycles, four packages, $858; bicycle material, two packages, $160.
British Australia—Bicycles and material, forty-nine packages, $2,065.
Cuba—Bicycle material, six cases, $203.
Copenhagen—Bicycle material, thirty-three packages, $1,593; bicycles, fifty-six packages, $496.
Chili—Bicycles, three cases, $59.
Dutch West Indies—Bicycles and material, three packages, $30.
Egypt—Bicycles and material, six packages, $157.
Florence—Bicycles, thirty crates, $688.
Glasgow—Bicycles, ten cases, $297.
Genoa—Bicycle material, one case, $70.
Havre—Bicycles, eighty-eight packages, $1,025; bicycle material, fifty-eight packages, $1,345.
Hamburg—Bicycle material, nine packages, $363.
London—Bicycles, three packages, $97.
Liverpool—Bicycle material, five cases, $485.
Malta—Bicycles, one case, $90.
Newfoundland—Bicycles and parts, two packages, $101.
Odessa—Bicycles and material, eleven cases, $200.
Rotterdam—Bicycles, one case, $30; bicycle material, eighteen packages, $421.
Southampton—Bicycle material, seven packages, $1,247.
Stockholm—Bicycles, one case, $20.
Swansea—Bicycles, one case, $20.
Tasmania—Bicycle material, one case, $115.
Turkey in Asia—Bicycles and material, four cases, $152.
United States of Colombia—Velocipedes, one case, $20.
Copenhagen—Motor vehicle parts, four packages, $250.
Ecuador—Motor vehicle, thirteen cases, $2,651.
Havre—Motor vehicle and parts, nine cases, $11,532.
Hamburg—Auto vehicle, one package, $145.
London—Auto vehicles, twenty-four cases, $13,890.
Liverpool—Auto vehicle, one package, $1,500.

PEERLESS COMPANY TO CHANGE LOCATION.

Lorain, O., Aug. 6.—The Peerless Mfg. Co. of Cleveland has been negotiating with the brass works syndicate for the purchase of the property on Penfield avenue, and the deal was closed today for a consideration of $40,000. The work of transferring the company's business here will begin as soon as possible. The works employ between 250 and 300 hands.

Cleveland, O., Aug. 12.—Being in need of a larger plant to increase its facilities the Peerless Mfg. Co. is casting about for a new site and has about decided to accept a proposition for the removal of the plant to Lorain, a thriving little city thirty miles from Cleveland. At Lorain there is a large empty factory, formerly used by a leading manufacturer of brass goods. A portion of the factory was formerly occupied by the Lorain Wheel Co., manufacturer of bicycles. The building is a three story brick, embracing over 70,000 square feet of floor space and more than 4 acres of ground. The company proposes to buy the factory, provided the Lorain people subscribe to an increase in the capital stock. The factory is to employ 400 men, indicating that the company intends to go into it on a large scale. Lorain is an hour's ride from Cleveland on the electric line and it is well situated for material and shipping. Manager Kitridge states if this deal is not closed the company will look elsewhere, as it desires to be in a larger factory before next year.

Marble-Swift Transmission Device.

The Marble-Swift Automobile Co., whose offices are in the Monadnock building, Chicago, has been incorporated under the laws of Arizona, with capital of $1,000,000. The incorporators are George P. Swift and H. G. Adams. Mr. Marble was formerly well known in the cycle trade and was a well known maker of wood rims at Plymouth, Ind., until he sold his plant to the American Bicycle Co. The new company has been formed to exploit the Marble-Swift transmission gear, which the owners claim is a perfect transmitting device "which provides a means, interposed between the prime mover and the driven or traction wheels, whereby the direction of rotation and the changes in the velocity of the receptive mechanism may be effected in gradually increasing or decreasing gradations almost without number." All

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W. R. Metzger, Detroit, Mich.
Ralph Temple & Austrian Co., 282 Wabash Ave., Chicago, Ill.
Fisher Automobile Co., Indianapolis, Ind.
Olds Gasoline Engine Works, Omaha, Neb.
W. C. Jaynes Automobile Co., 873 Main St., Buffalo, N. Y.
Day Automobile Co., St. Louis and Kansas City, Mo.
George Hannan, 1455 California St., Denver, Col.
Clark & Hawkins, Houston, Tex.
Hyslop Bros, Toronto, Canada.
Manufacturers' Co., 26 Freemont St., San Francisco, Cal.
A. F. Chase & Co., 215 Third St., Minneapolis, Minn.
Oldsmobile Co., 728 National Ave., Milwaukee, Wis.
Rochester Automobile Co., Rochester, N. Y.
F. E. Gilbert, Jacksonville, Fla.
Texas Imp. & Mach. Co., Dallas, Tex.
Abbott Cycle Co, New Orleans, La.
C. H. Johnson, Atlanta.
Sutcliffe & Co., Louisville, Ky.
Brown-Thompson & Co., Hartford, Conn.
Mason's Carriage Works, Davenport, Iowa.

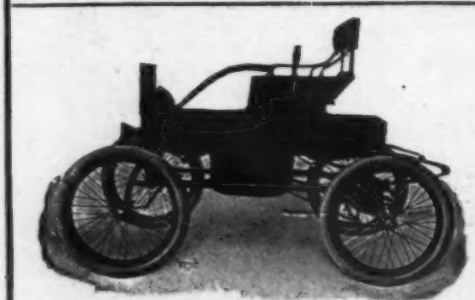
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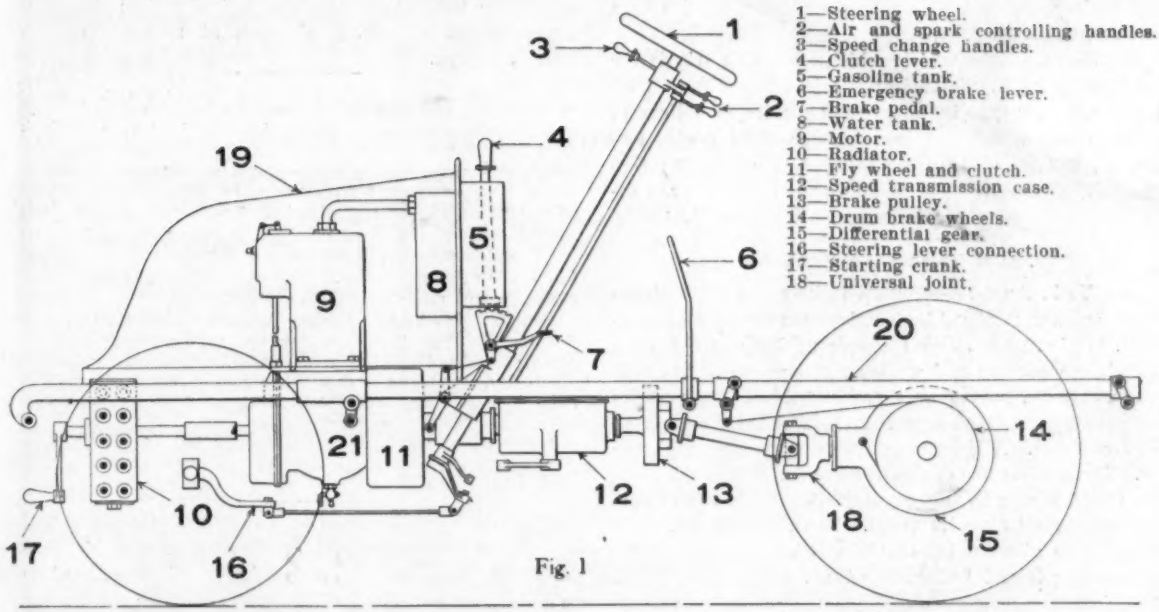


Fig. 1

the machinery is taken out of the body of the automobile and placed in a dust proof case which forms part of the rear axle. The company, not having filed an application for foreign patents, does not desire at this time to publish details of the mechanism, but states that it is absolutely simple, that the parts are few and that the equalizing gear is dispensed with.

DARRACQ DETAILS AND DOINGS.

The Darracq light gasoline automobile is one of the machines which figured prominently in the recent Paris-Vienna race. The type here illustrated took third and fifth places in its class, while second, sixth and ninth places in the race were secured by the heavier powered vehicles of the same make beating twenty heavier racing machines.

Fig. 1 shows a side elevation of the machine, with body removed, and Fig. 2 a plan view under the same conditions. From the table accompanying this description and reference to the figures a clear understanding of the drawings can be obtained.

A. C. Banker, the Chicago agent of the Darracq company, on Sunday last made a trip to Milwaukee and return. The up trip was made in 5:45 and the return trip in 8:30. Both going and coming the wrong road was taken and a journey of over 225 miles was made in rain and mud. The mud in some places was 10 or 12

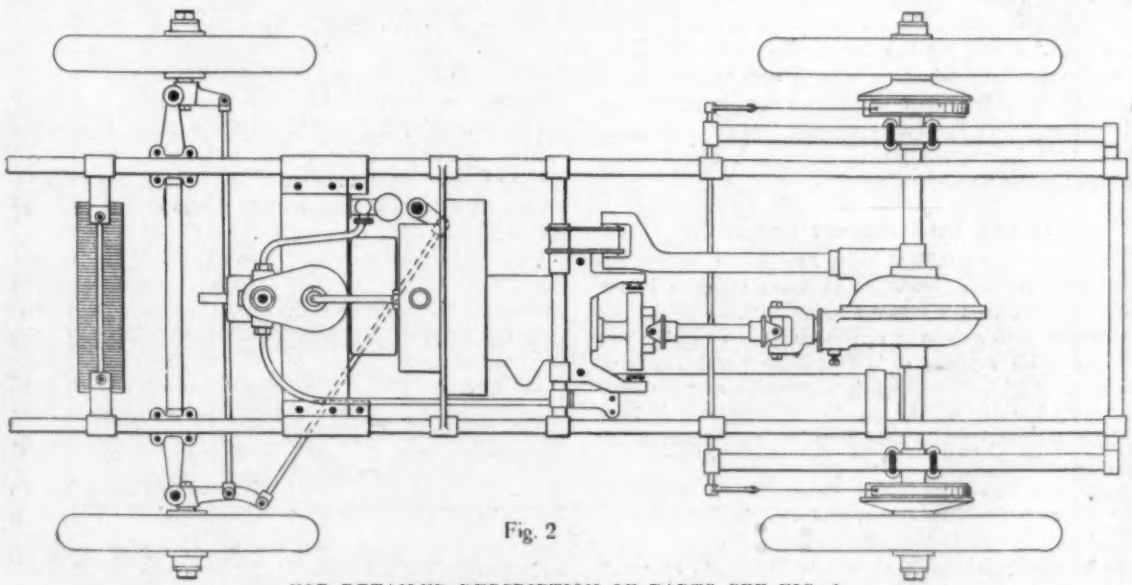


Fig. 2

FOR DETAILED DESCRIPTION OF PARTS SEE FIG. 1.

inches deep, yet not a stop was made for repairs or a bolt or nut loosened.

The Darracq light vehicle which made this trip is the one illustrated in the this article. It is equipped with a 9 horsepower gasoline motor and carries 4½ gallons of gasoline and water. It has three forward speeds and reverse, the forward speeds being 4, 15 and 30 miles. The vehicle weighs 1,250 pounds and, with tonneau attached, will carry five passengers.

Novel Tires on a Panhard.

New York, Aug. 11.—Roy A. Rainey has received the 40 horsepower Panhard he bought from Baron de Rothschild. It is fitted with an aluminum body of the King of Belgium pattern and weighs 2,800 pounds. The tonneau is roomy, having an extra high back that permits the passengers to look over the heads of those occupying the front seat. A light racing body came over with the car. The car has one of the new style multiple coil radiators that is new to this country. The tires are of special design, with a wire tread. The tread is flat. The car may be given a trial at the Brighton Beach meet of the Long Island Automobile Club.

Packard's Practical Pointers.

The Ohio Automobile Co., of Warren, O., has issued a pamphlet entitled Packard Pointers, whose very first utterance is well worth remembering. Here it is: "One minute of earnest thought will accomplish more toward locating any trouble you may have than one hour of crank hustling." Then follow a dozen pages or more of useful suggestions and diagrams. It is such a pamphlet as should be issued by every maker of an automobile, a practice which, if followed, would save owners a world of annoyance and expense.

Edison Company Purchases Columbias.

The New York Edison Co. has placed an order with the Electric Vehicle Co. of Hartford for several electric automobiles, including four tonneaus and two surreys. These vehicles are for the use of the superintendents of the various illuminating and power companies in New York and Brooklyn which are controlled by the Edison company. The tonneaus will be furnished with special rear bodies similar to those provided for the Electric Vehicle Co. chiefs' wagons.

Testing Collins Street Sweeper.

The Collins automobile street sweeper is now being tested in Hartford, Conn. It is made up of a steam boiler and engine, the latter serving both as propelling and motive power for the operation of a sweeping apparatus. This consists of a drum-like brush made of broom corn and it revolves as the machine moves along, picking up the dirt of the street and depositing it in a pan-like receptacle which is emptied at intervals for carts to gather up. The exhaust steam is sent out through the brush chamber, damping the brush in order to keep the dust down, and this it does effectually. The machine is to be manufactured by the Hartford Motor Machine Co. It is claimed that it can sweep the streets more economically than the horse sweepers and can do good work at the rate of five miles an hour.

New Incorporations and Enterprises.

ROCKFORD, ILL.—The Cotta Automobile Co., of which Charles Cotta is president and Frank H. Morse secretary, has begun operations in the Love plant. Messrs. Cotta and Morse have contracted with the Love company for the use of the plant for several months. The patterns have been turned out and the work on making the parts for the machine will begin immediately. It is hoped to have the first machine on the streets by the latter part of September. The company will make steam carriages.

BOSTON, MASS.—The Climax Electric Storage Battery & Vehicle Co. has been incorporated under Maine law to manufacture automobiles and carriages operated by steam, electricity, gasoline or any other power, $500,000 capital, $150 paid in. President, Wm. Bowker, of Waltham; treasurer, John Oldfield, of Boston.

JACKSON, MICH.—Articles of association of the Jackson Automobile Co. have been filed in the office of the county clerk.

There is a good opportunity for manufacturers and dealers in bicycle parts in the announcement of Holcombe & Co., the exporting firm of 100 Lexington avenue, New York. This firm is in the market for a number of articles, including chainless bicycles, brazed, upturned handle bars, B. S. A. pedals, bells, coaster brakes, etc. Those having control of any of these goods will find it advantageous to correspond with the firm.

A very dainty publication is the Brougham Booklet, just issued by the Electric Vehicle Co., descriptive of the new Columbia extension front and straight front broughams. During the past few weeks orders have been received for upwards of twenty of these luxurious vehicles, the purchasers including people prominent in wealth and social position in New York, Philadelphia and Newport.

E. P. Wells, until lately secretary of the manufacturers' association, spent Monday in Chicago en route to the west. Mr. Weise, of the Packard concern, was also a visitor. Both gentlemen spent a part of the day at the Chicago club house whose location and general appointment seemed to please them greatly.

The Ohio Automobile Co. is now making a machine with a double cylinder motor, practically two of its single cylinder motors coupled. It is preparing to make a car with a four-cylinder horizontal motor but this will not be offered until next season.

Vice Chancellor Stevens of Newark, N. J., has ordered the public sale of the assets of the Automobile Co. of America. The receiver had an offer of $100,000, but it was thought that the property would bring a better price at public sale.

The Calumet Tire Rubber Co., of Chicago, is reported to be seeking a location outside of the city and to have recently sent a representative to Terre Haute, Decatur, Danville and Springfield.

Ed. Eager, of Toledo, will sail from San Francisco on Saturday of this week on a trip around the world for the Goodyear Rubber Co., carrying also lines of cycles and automobiles.

SECOND
EDMOND, - - 16h., 12m., 30s.

THIRD
BARAS, - - - 17h., 17m., 52s.

FIFTH
HEMERY, - 17h., 28m., 28⅗s.

SIXTH
MARCELIN, - 17h., 45m., 18s.

NINTH
COLLIN, - - 19h., 19m., 35⅗s

NOTWITHSTANDING

The long distance, and, above all, the great difficulties of bad mountain roads in Switzerland and Austria, THE LIGHT

DARRACQ

Vehicles Have Figured Brilliantly

In the Paris-Vienna Race



THIS 36 HORSEPOWER RACER FOR SALE.

Taking FIRST PLACES and establishing records as they usually do; but most noteworthy is the fact that in the General Classification the light Darracq vehicles are third and fifth,

Beating Twenty Heavy Racing Machines. . . .

Proving not only that the Darracqs are the fastest, but are also superior to the Mastodon Racers in Endurance, Reliability and Regularity.

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DARRACQ
AUTO. CO.

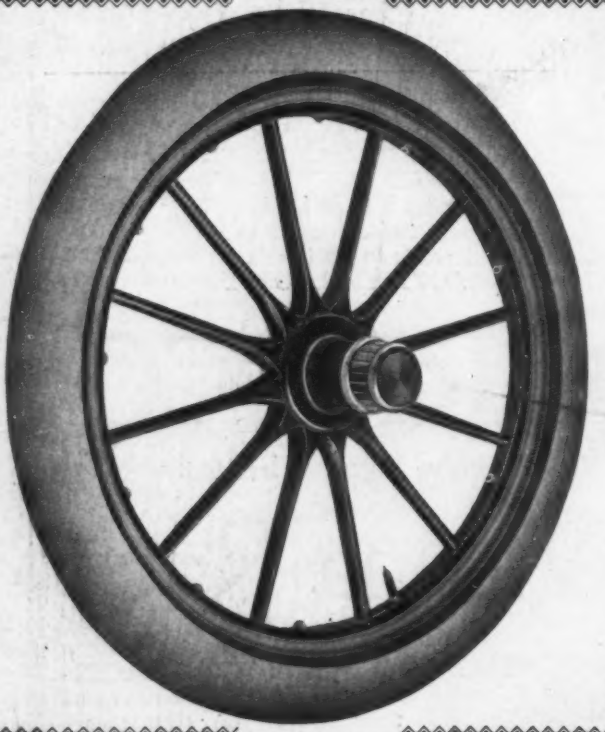
652 Hudson St., near 14th St. El. R. R. at 9th Ave.
NEW YORK

F. A. LaROCHE, Gen. Sales Mgr.

ALSO IN THE VOITURETTE CLASS . . .

FIRST

GUILLAUME, 18h., 54m., 50s.



Midgley Tubular Steel Wheels.

Artillery Pattern.

When in the market write the

Midgley Manufacturing Co.
Columbus, Ohio.

K. Franklin Peterson,
165 Lake Street, Chicago,
Western Sales Office.

THE ORIENT RUNABOUT



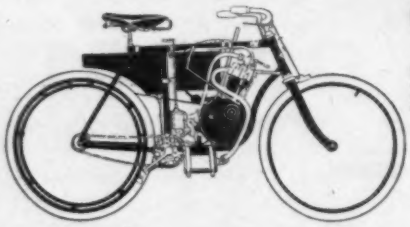
MODEL 1902. 8 H. P. PRICE, $875.

Powerful, Practical and Reliable.

All ordinary hills can be ridden on the high speed without the use of gearing. Speed controlled from 4 to 25 miles per hour, simply by pressure of toe on the throttle. Will climb 25 per cent. grade with two persons. :: :: :: :: :: :: ::

Write for Catalogue. Agents Wanted.

WALTHAM MFG. CO.,
WALTHAM, MASS.



ORIENT MOTOR BICYCLE

PRICE $250.00

Fitted with the New Orient 3 H. P. Motor.
Speed over 40 miles per hour.
The Most Powerful Motor Bicycle in the World.
Write for particulars. Agents wanted.

WALTHAM MFG. CO.,
WALTHAM, MASS.



THE CYCLE AGE

New York, Aug. 9.—Major Taylor and Willie Fenn fell upon Frank Kramer in the one-third-mile circuit championship final at Manhattan Beach this afternoon and did despitefully use him. This act of legalized highway robbery was performed under the rules permitting team work. When the final was called, with Kramer and Kimble in the race with them, the announcement was made that the light blond and the very dark brunette New Englanders were paired. Some 5,000 spectators who had gathered to see the sprinting despite the fact that no paced race was announced heard the announcement and braced themselves for the fun that was to come.

It came all right, and without long waiting. Kramer took the lead, followed by the major. The champion ran up the bank at the first turn to see what was going to be doing by the black and white pair. Taylor followed him. The pair wavered for an instant on the summit and then, quick as a flash, Fenn dashed down the hill for the pole. Taylor made almost a flying leap for his rear wheel and got it. In a jiffy the white was towing the black down the back stretch at top speed. When the teamed two had got fairly under way Kramer woke up and jumped after them. Half way to the last turn he caught them. When the procession struck the curve Kramer made play to get by; but he had the longer distance to go and Fenn was pacing Taylor very fast.

At the head of the stretch Fenn dropped the major into a safe lead. Kramer had failed to get around by the outside course into striking distance. Kimble dug through on the pole and lit out after the negro with the speed that always come to the veteran Kentuckian when the African is in the hunt. Taylor, though, was riding like the wind, and Kimble could not get within a length of him. Kramer was two lengths back and making no effort. Fenn had sat up after doing his part of the event so well.

The management's press agent had played up Taylor's hard lot all the week and his sympathizers by the hundred howled with happiness and hurled their hats on high. It was a clever bit of team work. Fenn had ridden very fast in the pull and Taylor had gone his best on the sprint. Whatever may be one's opinion of legalizing team work in championship contests it certainly was a thrilling race from the time of Fenn's runaway with Taylor began.

The major had his troubles in his trial heat. He insisted on trailing, and as usual ran his nose into a pocket. Bald, on the outside, beat him and he couldn't get by Bowler on the pole. Taylor claimed a foul on Bowler, who confessed to having touched the major on the turn by accident. The referee disqualified Bowler and this let Taylor into the semi-finals.

The crowd went wild over the racing and the management seemed convinced that for New Yorkers sprint racing is the thing. It certainly was a magnificent series of contests.

Big fields started in the 10-mile amateur and the 5-mile professional handicaps. In the former Hurley ran through the ruck in the homestretch and won in 24:01 after it looked as though he was out of it altogether. Lindley (100) was second and Vanderveer (100) third. In the 5-mile race Taylor was excused and Fenn started on scratch alone. He caught the bunch after 2 miles of plucky unpaced plugging and then sailed through to a really glorious conquest at the finish in the fast time of 11:07 4-5 for the old-fashioned wind-swept track. Kimble (150) was second, Schreiber (100) third, Rutz (200) fourth and Bald (200) fifth.

The 2-mile motor cycle race was the first handicap contest that has been attempted on a track in this country. A. Martineau, Canada (1¾ h. p. Indian) and L. J. Wyckoff, New York (3¼ h. p. Orient), were placed on scratch and eight others were strung out from 75 to 375 yards, mainly in accordance with horse power. The scratch pair outclassed the others and had caught and passed them at a little beyond a mile. Then the two had a glorious race of it to the finish. The Candian was the quicker to get under way and led the New Yorker 50 yards at the mile. Wyckoff, however, was coming fast, got within 10 yards of Martineau at the head of the stretch and just nipped him at the tape in the fast time of 3:04 from a standing start. It was certainly a great day of racing and will do much to make sprinting as popular in New York as it is at Newark.

CYCLE TRADE OF EUROPE.

Brussels, Aug. 1.—From a reliable source your correspondent learns that several months ago there was talk among a number of the large bicycle manufacturers of France, Germany and even one or two English firms, of forming a trust somewhat similar to the American Bicycle Co., with a view to trying every possible means

to oust American bicycles from Europe. There has been correspondence going on for a while, but it seems that the jealousy of some of the big fellows has been the cause of failure. Our manufacturers over here are first of all personal; that is, they work for themselves and try as hard as they can to work against the competitor. They have no intention whatever of working together.

Although American cycles are not more popular or in such great demand, they still have many friends and many dealers who handle them almost exclusively. The trashy class of cycles seem to have disappeared and while there are still a good number of cheap bicycles to be found, they are greatly superior in quality, finish and equipment to those which used to be sent here by the carloads 3 or 4 years ago. Although I am not personally familiar with the American Bicycle Co. representative in France, I consider this gentleman a most clever business man, and the company's business must have increased steadily. I think that if some of the larger independent makers would follow the steps and take interest in the big road and track events that a good business would result. This would probably not come directly from the large cities but from the country people. Some of the English firms seem to be on the eve of adopting a similar system to that of your mail order houses; that is, a sharp cut in prices and trial at business through mail exclusively.

BICYCLES WANTED IN SOUTH AFRICA.

Noorslaaget, South Africa.—Editor MOTOR AGE: Although this country is still under the restrictions of martial law and riding about out of the question for the present, I think it proper to apply to you in the meantime for catalogues and particulars. I consider this wide stretch of country with its endless roads from farm to farm specially adapted for the introduction of reliable roadsters, railways being few and far between. You cannot buy a chainless for less than £17 10s. One of my sons a few years ago had to pay £25 for one. Another one who wanted a chain cycle had to take an older model to get it for £15. According to these prices and the enormous charges for accessories and sundries, it will be apparent to you that so far only the better class of inhabitants could indulge in the luxury of possession of a machine. As most of the farmers had to dispose of their horses, there will be a wide field for the sale of good machines at a moderate figure. I beg to mention that chainless machines fitted with Dunlop tires are in favor.—Yours, etc., J. HESS, Postoffice, Glenconner.

ON THE CHAMPIONSHIP LADDER.

The national championship struggle seems to have settled down to a match between Kramer and Taylor, with a battle royal among Owen Kimble, George Collett and Lawson for the next round of the ladder. Willie Fenn is likely to give the latter trio trouble before the series closes unless he restricts his efforts to doing the donkey work for Taylor.

Kramer fairly ran away from Taylor in the final of the 5 mile national double point championship at Buffalo, beating him by several lengths. The major's six points for second place in a double point race, however, put him in second place. His defeat of Kramer at Manhattan Beach on Saturday, through Fenn's assistance, which is told elsewhere, brought Taylor still nearer to Kramer and widened the gap between the major and the Kimble-Collett-Lawson trio. When Taylor joined the circuit Kramer had 30 points to his credit. Since then Kramer has scored 35 to Taylor's 23, but the major was absent from one race.

The standing of the men up to the close of the Manhattan Beach meet on Saturday on the basis of five points for first, three for second, two for third and one for fourth, with double points for national championship races, follows:

	First.	Second.	Third	Fourth.	Points.
Kramer	10	1	3	0	65
Taylor	2	3	0	1	23
Kimble	0	3	2	1	18
Collett	0	2	3	2	15
Lawson	0	3	1	2	13
Fisher	0	0	2	0	6
Stevens	0	0	1	0	4
Wilson	0	0	1	1	3
Fenn	0	0	0	2	2
Bald	0	0	1	0	2
J. Bedell	0	0	0	1	2

This week the circuit is scheduled for New Haven on Tuesday and Atlantic City on Saturday.

RECORD—FIRST MOTOR CYCLE THIEF.

The Wisconsin Wheel Works is entertaining an interesting visitor just now, but the state of Wisconsin is paying the bill. Last Tuesday a man visited the office, stated that he was from Washington and that his name was Mason, and that he was touring from Washington to Spokane. The machine he had been riding was too light and he had sold it in Toledo, determining to buy a Mitchell in its place. The company sent him out for a ride, accompanied by one of its men, but by some means or other the pair became separated. The return of their man alone made the officers of the company suspicious and they discovered that the man Mason had made arrangements to ship the bicycle by train to Chicago. And so a dozen or more members of the staff started for the depot to engage in a man hunt and see the fun. Mason was there all right and so was the bicycle. When he saw the way the land lay he hid in a wood pile, but was captured and carried before a justice of the peace and held for trial.

It seems that the man was in Buffalo recently. He gave the Thomas people an order to ship to him a machine to Spokane, Wash., stating to them that he was the proprietor of a large hotel there. He was informed that it would be a week or ten days before the machine could be shipped there and he then informed them he would be in Buffalo for some little time. That afternoon or the next morning he telephoned up and asked them if he could get the use of an automobile for a short time. They had none to spare and he suggested that they loan him a motorcycle. Friday morning he showed up at their place of business in automobile cap,

WON ON
G & J TIRES

The Pierce Motorette, equipped with G & J Detachable Tires, operated by Mr. Percy P. Pierce, made the best record in the Chicago 100-mile Non-Stop Contest, August 2, 1902,

Winning the Silver Cup

"Mr. Pierce drove all the way from Buffalo to Chicago for the contest. The carriage used by Mr. Pierce was the smallest in the race, a narrow-gauge motorette of 3 1-2 horse power. Mr. Pierce has been using it continuously since April 26, when he won a first-class certificate at Long Island. He won another at New York on Decoration day, and with his victory Saturday becomes the only automobilist to possess blue ribbon certificates from all the endurance contests in the country.

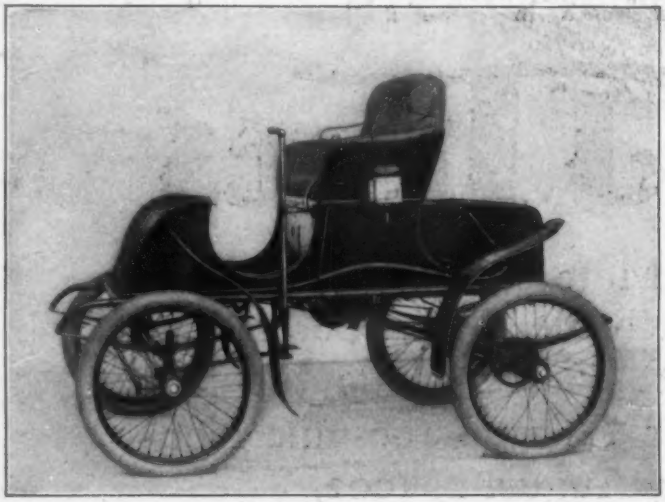
"First place in the gasoline consumption contest was also taken by Mr. Pierce's machine. He made the run using only three gallons and one quart of gasoline, while the average amount was six gallons and one quart."

The Extraordinary Resiliency of G & J Tires gives the Greatest Speed and the Greatest Mileage for Power Consumed.

G & J TIRE CO.

INDIANAPOLIS, IND.

STUDEBAKER AUTOMOBILES



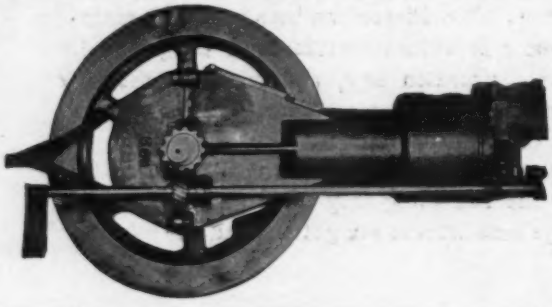
A NEW electric vehicle showing radical departures in many essential features. The battery consists of 24 cells, carried in the rear of the body compartment. The motor is rigidly suspended from the frame of the gear, just in front of the battery. The battery will give a run of 40 miles on one charge, and can be recharged from any 110 volts direct current lighting circuit. In the severe test made during the last year, no breaks have occurred in running gear. It is a vehicle made for every-day use on country roads or city streets.

Send for illustrated booklet.

STUDEBAKER BROS. MFG. COMPANY

NEW YORK CITY, - - Broadway and Prince Streets
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KANSAS CITY, MO., - - - - 810-814 Walnut Street
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DENVER, COLO., - - - - - 15th and Blake Streets
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"Ask Dasey."

NOTHING FANCY NOR ELABORATE BUT JUST A PLAIN, WELL-MADE, 4½x6 INCH.

Run About Engine

.....AT.....

$100.00 for Engine alone.
137.50 with Accessories.
160.00 for Engine and Champion Transmission Clutch.
197.50 for Engine, Transmission and Accessories.

We have engines ready for immediate delivery. Can ship same day as order is received. Our equipment includes Dow coils, plugs, batteries, Wilcox float carbureter and Loomis Muffler. Where can you find a better outfit at the price? CIRCULAR MATTER READY SOON. We are ready to contract with manufacturers for 1903 deliveries.

THE P. J. DASEY CO.

19-21 La Salle St., - - - CHICAGO, ILL., U. S. A.

C. V. DASEY, { 1536 Champa St. DENVER, COL. } Western Representative.

goggles and leggings and had no difficulty in securing one of their machines, and that is the last they saw of him.

Brown & Beck State Their Case.

Denver, Colo.—Editor MOTOR AGE: In your copy of the 7th inst. we note an article headed "Denver Dealers' Strenuous Action," a copy of a circular issued by the local association of cycle dealers, in which are several misstatements.

On July 24 we resigned as members of the Denver Bicycle Repairers' Association.

Members of the Denver Bicycle Repairers' Association do not do 95, or 65, per cent of the bicycle and repair business of Denver. Aside from jobbers there are eighty-five repair shops in the association; eighteen of them carry new bicycles, sixty are nominally repair shops, who do not average to carry a stock of $25 each, and seven are machine shops and enamelers, who carry no stock at all.

There are fully twenty-five live independent dealers in this city who can buy anything they want, as they pay cash and discount their bills. We are one of the twenty-five. While we do not know exactly what the other twenty-four do, we feel that they, the other twenty-four independent dealers, will aggregate to do three times as much as we do. If such is correct, note the following figures:

At this present writing and since January 1, 1902, we have taken in cash, from sales of bicycles, etc., $17,340. Add three times that amount, estimated sales of the other twenty-four, or $52,020, would make independent sales since January 1, $69,360. If lie No. 2 is not a lie, the D. B. R. A. must have done nineteen times that amount, or $1,317,840, of cash business alone. We know they did not do any such an amount of business, nor 10 per cent of that amount. We have (with orders on hand for next Monday's delivery) put out over 600 bicycles since January 1. We will wager $1,000 even, that the entire present retail membership of the Denver Bicycle Repairers' Association has not sold ten times the number of bicycles since January 1 that we have, or we will wager $100 even that they can not show bona fide purchasers of 3,000 bicycles since January 1, and we candidly have our doubts as to whether they have sold 1,500.

Believing you will be fair enough to publish this letter, as we deem your article harmful to us unless we are permitted to "tell our side."—Yours, etc., Brown & Beck.

Motor Cycle Suggestions.

For Quads.—A good improvement to any motor quad would, I think, be to fit a friction clutch. The labor involved in starting a quad with a passenger on board up even a slight rise is not to be sneezed at, especially if the machine is not sparking at its best. In traffic, too, the constant stoppages behind vehicles gives the driver a lot of starting work to do, and when the passenger is not altogether a light weight the mass to be moved is considerable. Hitherto the clutches fitted to motor tricycles and quads have required too expert manipulation to be successful without the machine rearing, and perhaps even overturning, as has actually been experienced, and what is required is a really good clutch that can be operated without danger. My suggestion applies also to the tricycle, but primarily to the quad, as being the heavier vehicle and carrying a heavier load.

To Shorten Sparking Plugs.—If the space between valves in an engine is so small as to cause the sparking plug to foul the valves, the plug can be made to project less into the combustion chamber by the use of two, or even three, copper asbestos washers instead of but the usual one.

To Reduce Pedal Reach.—If the frame of a motor cycle is too high for comfort, as it is in nine cases out of ten, it is best to use a shallow saddle, so as to get down well within one's reach, and carry part of the weight on the foot upon the lower pedal.—Cyclist.

Tribune Plant Goes to Westfield.

The manufacture of the Tribune, which has been carried on at Erie, Pa., for the last 10 years is to be transferred to the American Cycle Mfg. Co.'s plant at Westfield, Mass. The Tribune was formerly made by the Black Mfg. Co., under the management of L. B. Gaylor, now general manager of the Waltham Mfg. Co., and is recognized as one of the highest grades of bicycles made anywhere in the world. George Russell is now superintendent and it is understood that he will continue in the same position at Westfield. The abandonment of the Erie factory is a step in the centralization of the American Cycle Mfg. Co.'s business.

KELECOM MOTORS
FOR IMMEDIATE DELIVERY

Sizes: 1¾ h. p., 2¼ h. p., air cooled, 5 h. p., 7 h. p., 9 h. p. and 11 h. p. water cooled.

The Kelecom has been proven in American and European contests to be one of the most reliable and economical engines on the market. American builders who are using Kelecom Motors are all behind in their orders. The 1¾ and 2¼ h. p. Bicycle Motors are without an equal. Send for illustrated catalogue.

A. H. FUNKE,
98 Duane Street,
NEW YORK.

MOTOR CYCLE FUEL CONSUMPTION TEST.

Seven Machines Travel Fifty Miles at Average Cost of One-Sixth of a Cent a Mile.

New York, Aug. 9.—There were nineteen starters in the 50-mile fuel consumption test for power-driven two wheelers run by the New York Motor Cycle Club at the Manhattan Beach track this afternoon. A non-stop contest which was added as an adjunct became pretty nearly the whole thing long before 50 miles had been covered. Seven cycles completed the journey, all without a stop. These were the only ones to have their fuel consumption measured after nearly 2 hours of gasoline tank filling by the painstaking officials.

The nineteen starters embraced the following proportion of makes: Orient, 5; Columbia, 4; Auto-Bi, Mitchell and Merkel, 2 each, and Marsh, Royal, Holley and Clatch, 1 each. The start was set for noon. The non-arrival of the gasoline and the time it took to fill and measure the nineteen tanks caused a delay until



Start of the Motor Test.

1:45 p. m. A bicycle meet was to begin at 3 o'clock. This rendered null and void the 3 hours of grace granted the consumption testers to finish the journey and having the glory of learning how much gasoline their machines had used.

Two circumstances militated against a satisfactory all around fuel consumption test. In the first place the short time left by the delay in the arrival of the gasoline and the certainty that the bicycle contests would necessitate the cutting in two of the finishing leeway made it sure that only the fast ones would get through in time to have their fuel consumption measured. The second, however, was the chief impediment. Blue ribbons had been offered all those making the run without stops beyond the 10 minutes allowed for replenishing gasoline, lubrication and other ordinary requirements of the 50-mile journey. As a matter of fact, however, all the seven survivors at the finish went through without a stop for any purpose. The blue ribbon non-stop contest completely dwarfed in importance, in the eyes of the competitors, the mere experimental consumption test, interesting and valuable as it really was. So it was that as soon as a contestant had lost his chances for a blue ribbon he refused to offer himself up on the altar of scientific research into his fuel consumption and dropped out.

A speed limit of 30 miles an hour was set and enforced as strictly as possible.

The thousand or more spectators who had gathered to see something that at least looked like a race were vouchsafed no explanation of this rule beyond the mere announcement: "This is no speed contest, but an out and out fuel consumption test."

Some disappointed spectators could see no reason why a speed limit added to the value of a fuel consumption test and suggested that to their uninitiated minds it would seem that it would be far more interesting and valuable to learn how much gasoline the different makes and powers required to attain a certain rate of speed. The lay verdict was that the club had lost a chance for a fine speed test that would have given motor cycling big advertising without necessarily any lost opportunity to measure fuel consumption. The 30 miles an hour, however, was a generous limit and nineteen machines circling the track at that rate was far from a slow going spectacle.

John M. O'Malley, Hartford, Conn. (Columbia), went away in front and the three other Columbias with their riders wearing the Columbia bicycle team's yellow and white jerseys, were among the leaders. James Farley, a 17-year-old boy, on a Marsh, was among the contestants. O'Mally led at 20 miles in 39:30 and then his intake valve got out of order and he was obliged to quit. His Columbia team mate, Walter J. Ziegler, took up the running and was first at 25 miles in 53:35 4-5. There were twelve survivors at 20 miles and ten were left at 25 miles.

C. G. Arnold (Merkel) was the first to quit. He had trouble with his carbureter. The chain on Hafelfinger's Royal broke. C. Mankowski (Mitchell) had a punctured tire. Sparking plug and carbureter difficulties, however, seemed to be the main troubles of those who dropped by the wayside and refused to continue after losing blue ribbons.

Walter J. Ziegler (Columbia) finished first in 1:39:37 1-5; J. H. Wise (Orient), second, in 1:42-:51 3-5; D. B. Roberts (Columbia), third, in 1:44-:52 1-5. The other four finished within 10 minutes of Roberts.

The fuel consumption of the seven who finished was:

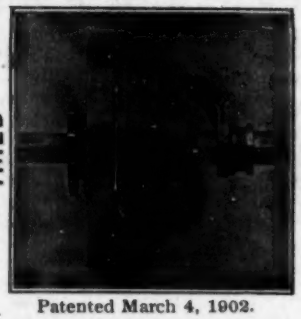
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J. H. Wise.....	Orient	2¼	5	8
F. E. Moskovitz.....	Orient	3	6	0
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*D. D. Miller.....	Orient	2¼	5	1

*Called off through error at 45 miles.

THIRTEENTH PARIS-BORDEAUX RACE.

Paris, August 1.—Bordeaux-Paris has just been won and lost; won by Maurice Garin, lost by Lesna. This great battle narrowed down early to a three-cornered match between Garin, Lesna and Pasquier, then to a hand to hand match between Garin and Lesna. It was one of the most tragical races in the whole history of that most tragical of races, and which may be ranged by the side of the Holbein-Mills, Cottereau-Stephane, Rivierre-Linton great duels.

The night and day turned out fine, a strong gale blowing in the back of the riders from the start right down to the finish, with the result that all the records were



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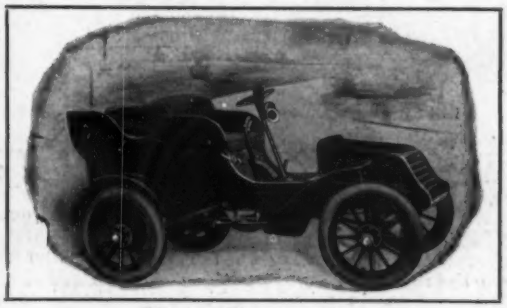
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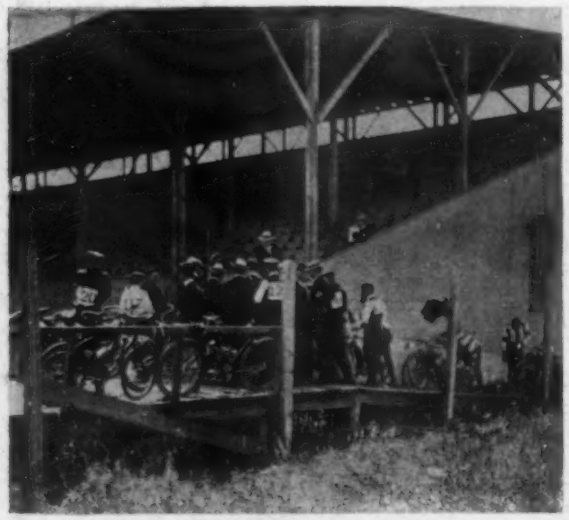
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not only broken, but pulverized. The 600 kilom. (372 miles) were ridden in the marvelous time of 18h. 41m. 20s, equal to 19 miles an hour all the way. And, mark it, singles alone were allowed to pace! The fastest time is the 16h. 35m. of Huret behind motor cars, while the next best under similar conditions stands to the credit of Lesna himself with 21h. 53m. 40s.

Last Saturday's race can be described briefly thus: At



Filling the Tanks—A Tiresome Operation.

6 p. m. sharp forty men were dispatched from the Quatre-Pavillons to a beautiful start. Lesna at once forced the pace, but could not shake off Garin, Pasquier and Muller, and the gap widened soon between this demoniacal quartette and the remainder of the field. The pace was a perfect cracker, according to the motorists who followed the race.

Not from any inaptitude on his part to live the pace, but from want of proper care Muller first gave up. Thirst, not speed, settled him. "A drink," shouted out he imploringly, at the top of the hardest hill. But his rivals were deaf, and Muller was left alone in the dark, hopelessly behind, while the trio who had as much refreshments as they wanted from the pacemaker in attendance, spurted away. A fierce, inhuman struggle is a road battle, to be sure! So much for the first act of the drama!

Nearing Angouleme (127 kilom.) the men had to cross a treacherous railway passage. Garin had made up his mind to make his effort at this particular spot and there he dashed off at top speed and got over the dangerous bit of ground safely. Behind him was a frightful crash. His two pursuers had come an awful cropper on the rails. There were two yells of despair in the night. Though bruised and hurt Pasquier was first up again in pursuit, but Lesna had to stop awhile. He passed his hand over his head and his hand was wet, tainted with blood. Nothing daunted, he dashed off again for all he was worth. It was a terrible chase between the three men. But Lesna had not done with bad luck yet. His tire burst, and his pacer's tires being in little better condition at the time, he had to make another long stop. At least it seemed so. A deadly halt in the night for a repair! Meanwhile Pasquier had had to throw the sponge. His knee after the smash had given way, and the man rode almost 10 miles under that physical pain, and he would go on. A doctor had to order him off his machine. Then he, too, sat down, daunted not by his wounds, but by the dire fate, and he wept bitterly over his undeserved defeat and scattered hopes. That's for another act of the drama.

Garin was going great guns all the time, making the best of his advantages, with Lesna hunting him desperately through the fine moonlight night, 42 minutes to the bad. All at once there was another shout in the silence of the hour. Georget, one of Lesna's two pacers, had come a cropper, bringing down his man with him. And here was the man lying motionless on the road with Lesna, badly hurt and scratched too, looking after him. That last blow seemed to have taken all the heart out of the plucky fellow. With a bulldog's obstinacy, though, he started off in pursuit. But the race was as good as run, and he knew it.

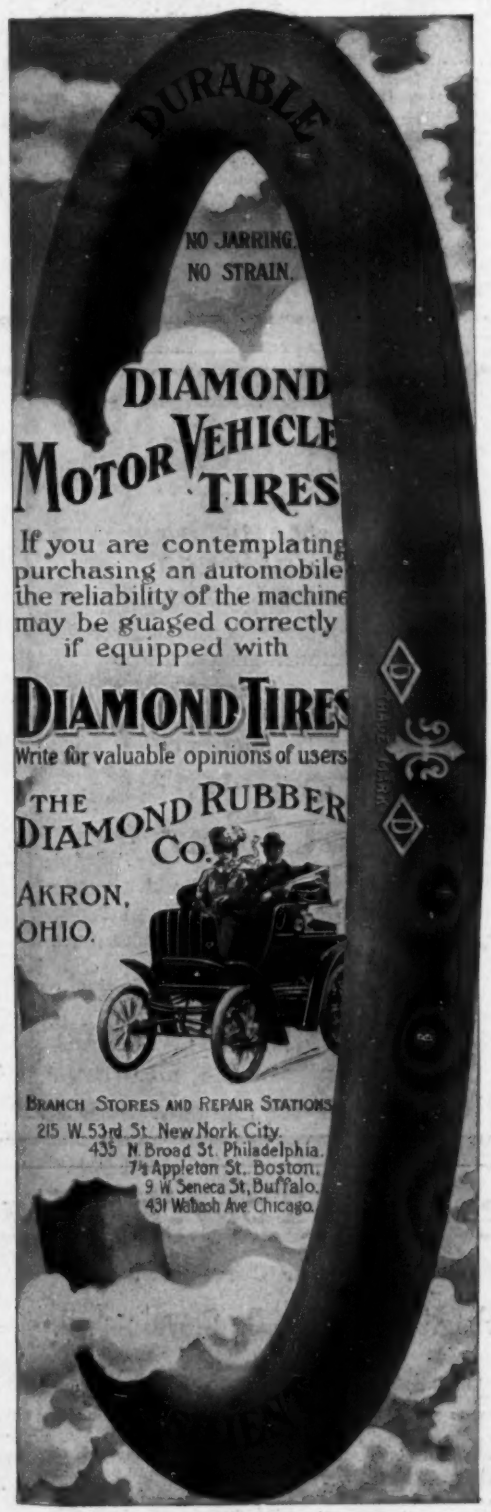
Hence the battle requires but little description, as Garin, who was one full hour to the good, kept moving on splendidly, never allowing his rival to regain one inch, and the "controls" were passed one after the other. The one-hour gap between the two men remained about the same. In the last stage of the journey, Garin, encouraged by the cheering of the crowd that lined the course, warmed up to his work, actually spurting away from his pacers on some of the hardest hills, and he reached the coveted goal wonderfully strong and fresh in the phenomenal time of 18h. 41m. 20s. Lesna put in an appearance some 70 minutes after him. Then came Muller, another hour and half later. The times ruled remarkably fast, only short intervals separating the men at the finish. And thus was another fine page added to the annals of the glorious cycle book.

On the same date as Bordeaux-Paris several important events were placed down for decision both at Auteuil and Buffalo, but, important as they were, they fall into insignificance compared with the great road battle. So we will briefly sum up the results. The 1 kilom. championship of France fell to the lot of Jacquelin, who showed a glimpse of his old form and managed to capture, by half a wheel, the blue ribbon of

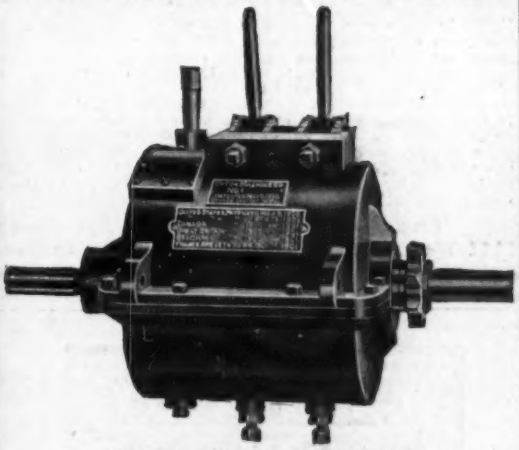


Columbia Team—Ziegler, O'Malley, Bernard and Roberts.

the path, after a good tussle with Domain all down the straight. In the absence of Huret, Bouhours had no trouble, despite many pacing mishaps, to do ditto with the 100 kilom. championship, much too short a distance, by the way, for an endurance contest, when you bear in mind that 100 kilom. (62 miles) at this period of our cycle story, can be easily reeled off in less than 1h. 30m. Bouhours' time was 1h. 41m. 32s.



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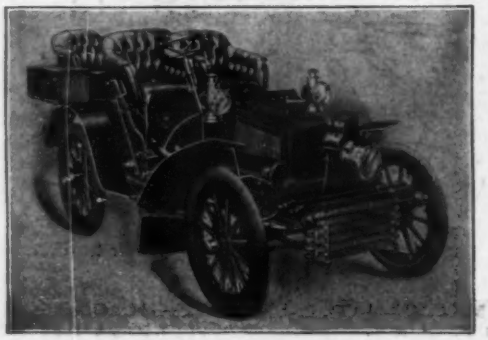
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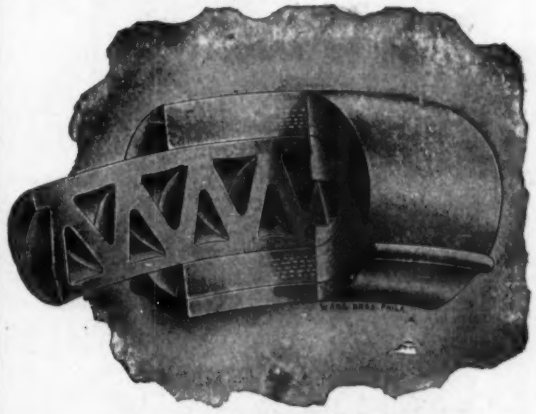


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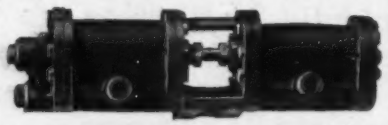


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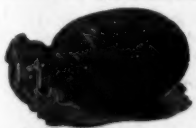
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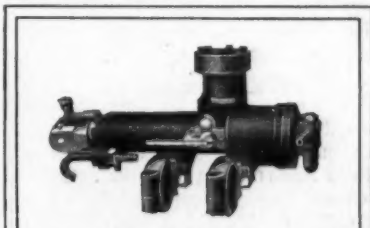
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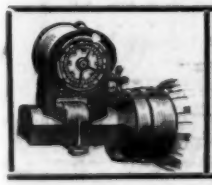


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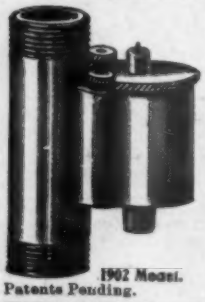


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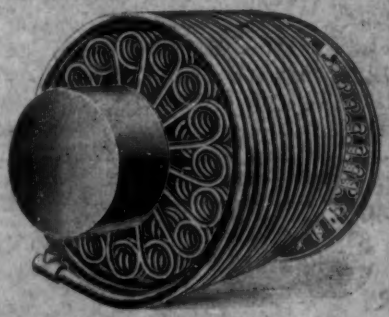
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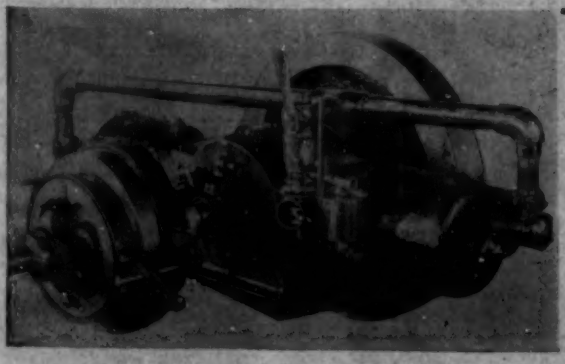
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